Barco® Media Server

XHD-Series User Guide

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Barco Media Server: XHD-Series User Guide

Barco

Changes

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EN55032/CISPR32 Class A Multimedia Equipment

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Declaration of Conformity

Manufacturer's Name:	Barco Lighting Systems Inc.
Manufacturer's Address:	2105 Gracy Farms Lane Austin, Texas 78758 USA
Distributor's Name:	Barco Lighting Systems Inc.
Distributor's Address:	2105 Gracy Farms Lane Austin, Texas 78758 USA
Product Name:	Professional Video Processor
Product Options:	**Models:** XHD-404, XHD-402, XHD-400, XHD-200

We hereby declare that the above referenced product complies with the essential requirements of Council Directives 2004/108/EC (EMC), 2006/95/EC (LVD) and 2011/65/EC (RoHS).

Safety:	EN 60950-1:	2006 + A11 (2009) + A1 (2010) + A12 (2011)
EMC:	Emission:	EN 55022 (2010) EN 61000-3-2 (2006) + A1 2009) + A2 (2009) EN 61000-3-3 (2008)
	Immunity:	EN 55024 (2010)

ROHS:	**Restricted Substances**	**Maximum Concentration Value (by weight in homogeneous material)**
	Cadmium (Cd)	0.01%
	Lead (Pb)	0.1%
	Mercury (Hg)	0.1%
	Hexavalent Chromium (Cr(VI))	0.1%
	Polybrominated Biphenyl (PBB)	0.1%
	Polybrominated Diphenyl Ethers (PBDEs)	0.1%

Kenneth S. Hansen

Compliance Engineer

May 29, 2015

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Revision history

Revision number	Date	Remarks
03.00	August 14, 2015	Fourth release • Added *Display properties (p.95)*. • Added *Timeline properties (p.119)*. • Added *Encoding with transparency (p.142)*. • Updated *Box content (p.26)*. • Updated *Connections (p.28)*. • Updated *Displays pane (p.93)*. • Updated *Media pane (p.101)*. • Updated *Properties pane (p.112)*. • Updated *Figure H.12, "Media Encoder"*. • Updated *Keyframing (p.146)*. • Updated *Outputs layout (p.184)*.
02.00	July 29, 2015	Third release • Added *Minimum laptop requirements (p.33)* to *XDG-100 Designer licensing (p.33)*. • Additions to *Keyframing (p.146)*.
01.00	July 2, 2015	Second release • Added *X-Agora interface (p.55)*. • Added *Programming workflow layout (p.171)*, *Calibration layout (p.173)*, *Outputs layout (p.184)*, and *Playback workflow layout (p.201)*.
00.00	June 17, 2015	Initial release

Section 1: Introduction

Barco® Media Servers are fully integrated visual production systems that enable video professionals to easily develop their show from idea to realization. Allowing users to quickly and easily set up, preview, and manage their show environment, they form the perfect connection between the creative ideas and the display systems that bring them to life.

Barco couples its media server hardware with the X-Agora™ software suite. This software is scalable, compatible with popular media formats, supports connectivity with various sensors and input, and makes it possible to deploy content onto the most challenging surfaces with an advanced yet easy-to-use projection mapping tool. Its interactive media system captures and processes data in real-time, creating interactive media content for various types of displays.

1.1 About this guide

1.1.1 This guide

This user guide describes how to operate a Barco Media Server. The user guide is designed to be a reference tool in the everyday work of the user with the product. It contains a complete description of the hardware components and the software suite. The manual also includes all the necessary instructions on how to upgrade and reinstall the software.

Note

Barco provides a 1-year parts and labor warranty for all hardware components. Please refer to the Appendix B, "Warranty," for specific details regarding the warranty terms.

1.1.2 Available system documentation

This guide is part of the documentation set describing the Barco Media Server product.

Please check online at the *Barco Media Server website* for the other documents.

Tip

Always check for the latest version of all documents on the *Barco website*.

1.2 Symbols, pictures, and fonts

1.2.1 Symbol overview

The following icons are used in the manual:

Caution

This symbol appears adjacent to Caution messages. Not heeding these messages could result in personal injury and/or damage to equipment.

Warning

This symbol appears adjacent to high voltage warning messages. Not heeding these messages could result in serious personal injury.

Info

This symbol indicates a term definition or general information about a term.

Note

This symbol appears next to extra information about the described subject.

Tip

This symbol appears next to extra advice about the described subject.

1.2.2 Picture overview

Images and pictures given in the manual are used as illustration. The content of the images can be slightly different from reality, e.g. version numbers, device types, installed modules, form and position of software windows on screen, etc.

1.3 Standards and safety

This section lists standards that apply to Barco Media Servers and describes safety precautions that must be observed when installing and operating a product from Barco.

1.3.1 General safety instructions

- Read this manual thoroughly before operating this equipment.
- Adhere to all warnings in this manual.
- Follow precisely all instructions for operating and use of this equipment.
- Adhere to all local installation codes.
- Retain this manual for future reference.

For further safety information see the *Barco Media Server XHD-Series Safety Guide*.

1.3.2 Standards

Safety regulations

This equipment is built in accordance with the requirements of the international safety standards EN60950-1, IEC60950-1, UL60950-1, and CAN/CSA C22.2 No.60950-1, which are the safety standards of information technology equipment, including electrical business equipment.

These safety standards impose important requirements on the use of safety critical components, materials, and insulation, in order to protect the user or operator against risk of electric shock and energy hazard and having access to live parts.

Safety standards also impose limits to the internal and external temperature variations, radiation levels, mechanical stability and strength, enclosure construction and protection against the risk of fire.

Simulated single-fault condition testing ensures the safety of the equipment to the user, even when the equipment's normal operation fails.

Electromagnetic interference

Barco Media Servers comply with the following EMC standards:

Electromagnetic compatibility —emission:	EN 55022: (2010)
	EN 61000-3-2 (2006) +A1 (2009) + A2 (2009)
	EN 61000-3-3 (2008)
Electromagnetic compatibility —immunity:	EN 55024 (2010)

EN55022/CISPR22 Class A ITE (Information Technology Equipment)

Barco Media Servers are products of class A ITE. ITE stands for Information Technology Equipment. ITE is subdivided into two categories denoted class B ITE (products intended

primarily for use in domestic environment) and class A ITE (all other ITE which satisfies the class A ITE limits but not the class B ITE limits).

Caution

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

FCC compliance statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his or her own expense.

1.3.3 Precautions

Warning

For your own protection, observe the following safety precautions when installing and operating your device.

- Before operating the units, please read this manual thoroughly and retain it for future reference!
- Observe all warnings and instructions printed on the devices!
- Barco Media Servers do not require any maintenance work or servicing. Servicing should never be carried out by unauthorized personnel!
- Never open the case of the unit without first disconnecting the power supply cord!
- To prevent fire or electrical shock hazard, do not expose this unit to rain or moisture!
- Do not place any warm or heat dissipating sources in the vicinity of the unit.
- This product should be operated from an AC power source!
- Check that the voltage and frequency of your power supply match those printed on the device label showing the rated electrical values!
- If you are not sure of the type of AC power available, consult your dealer or local power company!

- This product is equipped with a 3-wire grounding plug, i.e. a plug featuring a third (grounding) pin. This plug will only fit into a grounding-type power outlet. This is a safety feature. If you are unable to insert the plug into your outlet, contact your electrician to replace the obsolete outlet. Do not defeat the purpose of the grounding-type plug!
- This equipment must be grounded (earthed) via the 3-conductor AC power cable supplied. (If the power cable supplied is not the correct one, consult your dealer.)
- Do not allow anything to rest on the power cord. Do not position this product in places where people will walk on the cord. To disconnect the cord, pull it out by the plug. Never pull the cord itself.
- If an extension cord is used with this product, make sure that the total of the ampere ratings on the products plugged into the extension cord does not exceed the extension cord ampere rating.
- Never push objects of any kind into this product through cabinet slots as they may touch dangerous voltage points or short out parts that could result in a risk of fire or electrical shock.
- Never spill liquid of any kind on the product. Should any liquid or solid object fall into the cabinet, unplug the set and have it checked by qualified service personnel before resuming operations.
- Lightning—For extra protection of this video product during a lightning storm, or when it is left unattended and unused for a long period of time, unplug it from the wall outlet. This will prevent damage to the unit due to lightning and AC power-line surges.

Power cords with NEMA 5-15 plugs

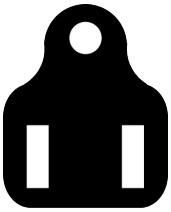


Figure 1.1. NEMA 5-15 plug

green or yellow + green	earth (ground)
blue or white	neutral
brown or black	line (live)

- The cord set must be UL approved and CSA certified.
- The minimum specification for the flexible cord is No. 16 AWG, type SJT, 16 A, 60°C, 4.5 m long max., 125 V, 3-conductor.

- The cord set must have a rated current capacity of at least 11 A.
- The attachment plug must be an earth-grounding type with a NEMA 5-15P (15 A, 125 V) configuration.

General installation instructions

- Do not place this unit on an unstable cart, stand, or table. The unit may fall, causing serious damage to it.
- Do not use this unit near water.
- Do not use any power cords other than the one supplied with your unit. While appearing to be similar, other power cords have not been safety tested at the factory and must not be used to power the unit. For a replacement power cord, contact your dealer.
- Slots and openings in the cabinet and the sides are provided for ventilation. To ensure reliable operation of the unit and to protect it from overheating these openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa, rug, or other similar surface. This product should never be placed near or over a radiator or heat register. This unit should not be placed in a built-in installation or enclosure unless proper ventilation is provided.
- The maximum recommended ambient temperature for this equipment is 40°C.
- When using the unit in a multi-unit rack assembly or closed assembly, the ambient temperature inside the assembly may not exceed the maximum rated ambient temperature.
- When installed in a rack, the installation should be such that the amount of air flow required for safe operation of the equipment is not compromised. The mounting of the equipment should be such that no hazardous condition is achieved due to uneven mechanical loading.

1.3.4 Additional information

Servicing

Barco Media Servers do not require any servicing or regular maintenance work.

Cleaning

Unplug this product from the wall outlet before cleaning. Do not use liquid or aerosol cleaners.

Unpacking of devices

For unpacking, follow the instructions and advice indicated on the outside of the packaging.

Repacking

Keep the original shipping carton and packing material; they will come in handy should you ever have to ship your unit. For maximum protection, repack your equipment as it was originally packed at the factory.

1.4 Environmental information: disposal

1.4.1 Disposal of the product (Waste Electrical and Electronic Equipment)

This symbol on the product indicates that, under the European Directive 2012/19/EU governing waste from electrical and electronic equipment, this product must not be disposed of with other municipal waste. Please dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. To prevent possible harm to the environment or human health from uncontrolled waste disposal, please separate these items from other types of waste and recycle them responsibly to promote the sustainable reuse of material resources.

For more information about recycling of this product, please contact your local city office or your municipal waste disposal service. For details, please visit the Barco website at: *http://www.barco.com/en/AboutBarco/weee*.

1.4.2 Disposal of batteries

This product contains batteries covered by the Directive which must be collected and disposed of separately from municipal waste.

If the battery contains more than the specified values of lead (Pb), mercury (Hg) or cadmium (Cd), these chemical symbols will appear below the crossed-out wheeled bin symbol.

By participating in separate collection of batteries, you will help to ensure proper disposal and to prevent potential negative effects on the environment and human health.

1.5 RoHS compliance

1.5.1 中国大 RoHS (Chinese Mainland RoHS)

零件项目(名称) Component name	有毒有害物质或元素 Hazardous substances or elements					
	铅 Pb	汞 Hg	镉 Cd	六价铬 Cr6+	多溴联苯 PBB	多溴二苯醚 PBDE
印制电路主要配件 Main printed circuit assembly	X	O	O	O	O	O
插入式印制电路配件 Plug-in printed circuit assembly	X	O	O	O	O	O
外接电(线)缆 External Cables	X	O	O	O	O	O
内部线路 Internal wiring	X	O	O	O	O	O
散热片(器) Heatsinks	O	O	O	O	O	O
电源供应器 Power supply unit	X	O	O	O	O	O
风扇 Fan	X	O	O	O	O	O
电池(组) Batteries	X	O	O	O	O	O
底架 Chassis	O	O	O	O	O	O
螺帽,螺钉(栓),螺旋(钉),垫圈, 紧固件 Nuts, bolts, screws, washers, fasteners	O	O	O	O	O	O
这个表被制备按照规定SJ/T 11364 This table is prepared in accordance with the provisions of SJ/T 11364.						
O: 表示该有毒有害物质在该部件所有均质材料中的含量均在 SJ/T 11363 标准规定的限量要求以下. O: Indicates that this toxic or hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in SJ/T11363.						
X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T 11363 标准规定的限量要求. X: Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in SJ/T11363.						

Table 1.1. 中国大 RoHS (Chinese Mainland RoHS)

在中国大陆销售的相应电子信息产品（EIP）都必须遵照中国大陆《电子信息产品污染控制标识要求》标准贴上环保使用期限（EFUP）标签。Barco产品所采用的EFUP标签（请参阅实例，徽标内部的编号使用于制定产品）基于中国大陆的《电子信息产品环保使用期限通则》标准。

All electronic information products (EIP) that are sold within Chinese Mainland must comply with the “Electronic Information Products Pollution Control Labeling Standard” of Chinese Mainland, marked with the Environmental Friendly Use Period (EFUP) logo. The number inside the EFUP logo that Barco uses (see the figure) is based on the “Standard of Electronic Information Products Environmental Friendly Use Period” of Chinese Mainland.

Figure 1.2. EFUP logo

1.5.2 Turkey RoHS compliance

Türkiye Cumhuriyeti: AEEE Yönetmeliğine Uygundur.

[Republic of Turkey: In conformity with the WEEE Regulation]

1.6 Terms and definitions

3G	A 3 Gbit/s serial digital 10-bit or 12-bit video interface (SMPTE 424M and 425M).
Active DisplayPort-to-DVI Adapter	A DisplayPort-to-DVI adapter that converts the DisplayPort signal to DVI. A passive DisplayPort-to-DVI Adapter carries the signal from a DisplayPort port to a DVI port, without conversion. With a passive adapter, the video card must perform the conversion.
Genlock	A module that allows synchronization to external sources and delivers synchronized display output.
HD-SDI	High-Definition Serial Digital Interface; an HD-SDI signal (SMPTE 292M). Format examples include 720p, 1080i, and 1080p.

Master Power Switch	Power switch on the rear panel of a Barco Media Server. The Master Power switch removes power from the unit, *without performing a shutdown*.
Power Switch	Power switch on the front panel of a Barco Media Server. The Power switch performs a shutdown, then removes power from the unit.
SD-SDI	Standard-definition Serial Digital Interface; an SD-SDI signal (SMPTE 292M). Format examples include 480i and 525i.
System Restore	A process that can restore the applications and settings on the C: drive to their original condition. System Restore also restores the needed software licenses. A Full Restore can erase the data on the D: drive.
Windows Image	Operating system. This version of the Barco Media Server is based on Microsoft® Windows® 8.1 EMB Industry Pro and must be at least version 01.06.00.
X-Agora	Refers to the GUI application that allows you to create, run, and monitor a project. X-Agora software suite refers to X-Agora, X-Agora Agent, X-Agora Player, and X-Agora Server. See *The X-Agora architecture (p.48)*.

Section 2: Installation

This chapter gives instructions on how to install and run both the hardware and software of the Barco Media Server, powered by X-Agora.

2.1 Installation requirements

Warning

Let the Barco Media Server acclimate to the ambient temperature after unpacking. Ensure that the humidity is within the specification. Neglecting this may result in startup failure of the device.

2.1.1 Disconnect device

Where a disconnect device is not incorporated in the equipment, or where the plug on the power supply cord is intended to serve as the disconnect device:

- for PERMANENTLY CONNECTED EQUIPMENT, a readily accessible disconnect device shall be incorporated external to the equipment.
- for PLUGGABLE EQUIPMENT, the socket-outlet shall be installed near the equipment and shall be easily accessible.

2.1.2 Barco Media Server Windows® image

This version of the Barco Media Server is based on Microsoft® Windows® 8.1 EMB Industry Pro and must be at least version 01.06.00.

Verify that the Barco Media Server is loaded with the latest Windows image available on the *Barco website*. Refer to *Restore (p.37)* for more information about upgrading the Barco Media Server Windows image.

2.1.3 X-Agora GUI

The X-Agora GUI software must be at least Version 2.2.000.

2.2 Initial inspection

2.2.1 General

Before shipment, the Barco Media Server was inspected and found to be free of mechanical and electrical defects. As soon as the Barco Media Server is unpacked, inspect it for any damage that may have occurred in transit. Save all packing material until the inspection is completed. If damage is found, file a claim with the carrier immediately. Notify the Barco sales and service office as soon as possible.

2.2.2 Unpacking

At delivery the Barco Media Server is packed in a cardboard box. Place the box on a stable (solid), flat, and insulated support during all the unpacking. Open the box from the top. Remove the Barco Media Server from its antistatic bag. Check the box content.

After unpacking let the Barco Media Server acclimate to room temperature, which must be higher than 0°C (32°F) and lower than 40°C (104°F). Neglecting this may result in startup failure.

Save the original shipping box and packing material; these will be necessary if you ever have to ship your Barco Media Server. For maximum protection, repack your Barco Media Server as it was originally packed at the factory.

2.2.3 Box content

After unpacking the Barco Media Server, check if all of the following items were included:

Product contains	Accessories included
XHD-200 2RU rack-mount chassis	• Barco Media Server assembly • USB System Restore drive[1] • USB keyboard • USB mouse • US Power Cord NEMA 5/15 (not included with units shipped to China)[2] • 1× active DisplayPort-to-DVI adapter • Safety guide
XHD-400/2/4-Series 4RU rack-mount chassis	• Barco Media Server assembly • USB System Restore drive[1] • USB keyboard • USB mouse • US Power Cord NEMA 5/15 (not included with units shipped to China)[2] • 5× active DisplayPort-to-DVI adapters • Safety guide

Table 2.1. Box content

Notes:

1. The USB System Restore drive contains the user guide and the recovery software. To restore the system using the USB System Restore drive, see *Restore (p.37)*.
2. Barco does not provide power cords for all locations. It may be necessary to install a power-cord cap for your location. See *Replacing a power-cord cap (p.69)*.

Note

Although the Barco Media Server ships with only active DisplayPort-to-DVI adapters, the video output card can handle two DisplayPort-to-DVI conversions on its own; for these conversions you *may* use *passive* DisplayPort-to-DVI adapters. If you wish to connect to more than two DVI devices to the video output card, you *must* use *active* Display-Port-to-DVI adapters for the any conversions beyond the first two. Connect passive adapters to ports 1 and 2, and connect active adapters to ports 3 and 4.

You may also use a passive DisplayPort-to-DVI adapter for the desktop display (primary video card) conversion.

2.3 Rack-mount procedure

The Barco Media Server chassis is designed to be rack mounted. Please note the following important points:

- The Barco Media Server is 4RU in height.
- The maximum ambient operating temperature is 40° C.
- Leave sufficient front and rear space to ensure that airflow through the Barco Media Server is not restricted.
- Distribute the units evenly, when installing equipment in a rack, to prevent hazardous conditions that may be created by uneven weight distribution.
- Connect the Barco Media Server only to a properly rated supply circuit.
- Maintain reliable grounding (earthing) of rack-mounted equipment.
- Mount the Barco Media Server from the front rack ears, using four rack screws (not supplied).

  (Threads may be metric or otherwise, depending upon the rack type.)

Caution

At a minimum, an XHD-400 Series server chassis weighs 13.6 kg (30 lbs.). To avoid injury, we recommend that two people rack mount the chassis.

2.4 Connections

Make the following connections to the rack panel of the Barco Media Server.

2.4.1 Main connections

1. Connect a monitor to the DVI port labelled “Desktop.”

   (DVI cable not included.)
2. Connect keyboard and mouse to USB 2.0 ports.
3. *Optional*—Connect the Ethernet cable from a modem or a router to the Ethernet port.
4. Connect power cord.

2.4.2 Output, video capture, and genlock connections

XHD-200

Connect up to two outputs through the DisplayPort and DVI ports on the video output card.

XHD-200 servers do not have video capture or genlock ports.

XHD-400

Connect up to four outputs through the DisplayPort ports on the video output card. If necessary, use the active DisplayPort-to-DVI adapters provided by Barco.

XHD-402

1. Connect up to four outputs through the DisplayPort ports on the video output card.

   If necessary, use the active DisplayPort-to-DVI adapters provided by Barco.
2. Connect up to two inputs through the DVI ports on the video capture card.

XHD-404

1. Connect up to four outputs through the DisplayPort ports on the video output card.

   If necessary, use the active DisplayPort-to-DVI adapters provided by Barco.
2. Connect up to four SDI inputs through the BNC ports on the video capture card.
3. Connect the genlock source to the BNC port on the synchronization (genlock) card to synchronize to an external signal.

2.5 Powering ON the Barco Media Server

Switch the master power switch on the rear panel to ON.

The Barco Media Server box turns on immediately.

Note

If the system is powered off any time after it has been initially powered on, you can power on the system again using the power switch on the front panel. If the Barco Media Server does not start, ensure that the master power switch on the rear panel is ON.

Ensure that the Barco Media Server is connected to an appropriately-rated power source.

Warning

This equipment is designed for connection to a branch circuit having a maximum overload protection of 20 A.

2.6 Software startup

Barco Media Server boxes come pre-installed with Microsoft® Windows® Embedded 8.1 x64 and X-Agora™. When the box is powered on, Windows opens an empty desktop with two icons in the left-hand corner of the taskbar.

- Double-click the X-Agora icon either on the taskbar or on the Desktop) to open X-Agora.
- Right-click the Windows icon on the taskbar to gain access to the following items:
  - Control Panel
  - File Explorer
  - Run
  - Shut down or sign out
  - Desktop
- Select (left-click) the Windows icon, and select the circled down-arrow on the Start screen, to access all applications on the machine.

2.7 Licensing

Barco Media Server boxes come pre-installed with Microsoft® Windows® Embedded 8.1 x64 and X-Agora™.

Barco Media Server software is secured by the CodeMeter hardware and software licensing solution from Wibu Systems. A local runtime application, *CodeMeter Control Center* (also known as *CodeMeter User Runtime*) controls the licenses. An XHD-Series license

or an XDG-100 Designer license contains only the licenses needed to operate Barco Media Server software. Barco Media Server software can be downloaded from the *Barco website*. Go to *http://www.barco.com/* → Products & Solutions → Image Processing → Media Servers.

2.7.1 CodeMeter Control Center

The CodeMeter Control Center runtime application must run on each machine on which Barco Media Server software is expected to run. CodeMeter Control Center is the local management tool for hardware and software licenses, and it also plays a crucial part in updating licenses remotely. CodeMeter Control Center is preinstalled on all Barco Media Servers, and it is also part of the Barco Media Server software installer.

Note

If needed, CodeMeter Control Center (*CodeMeter Runtime 5.21b* or later) can be downloaded from *http://codemeter.com/us/service/downloads.html*http://codemeter.com/us/service/downloads.html.

2.7.2 Launching CodeMeter Control Center

Use the CodeMeter Control Center to check current licenses or request an update for an existing license. Launch the CodeMeter Control Center with a single step.

1. Double-click the **CodeMeter Icon** in taskbar notification area to launch the CodeMeter Control Center.

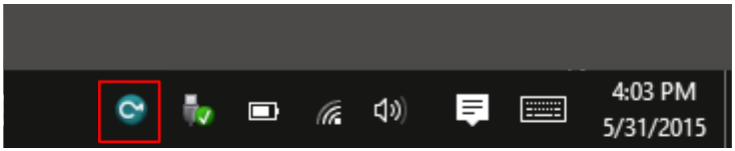


Figure 2.1. Launching CodeMeter Control Center

2.7.3 XHD-Series licensing

This section describes how to check current licenses and request an update for an existing license issued by Barco for a Barco Media Server XHD-Series server.

Checking current licenses

1. Launch the CodeMeter Control Center.
2. Find the XHD-Series license listed in CodeMeter Control Center (See *Figure 2.2, "CodeMeter Control Center overview for XHD-series license."*.)

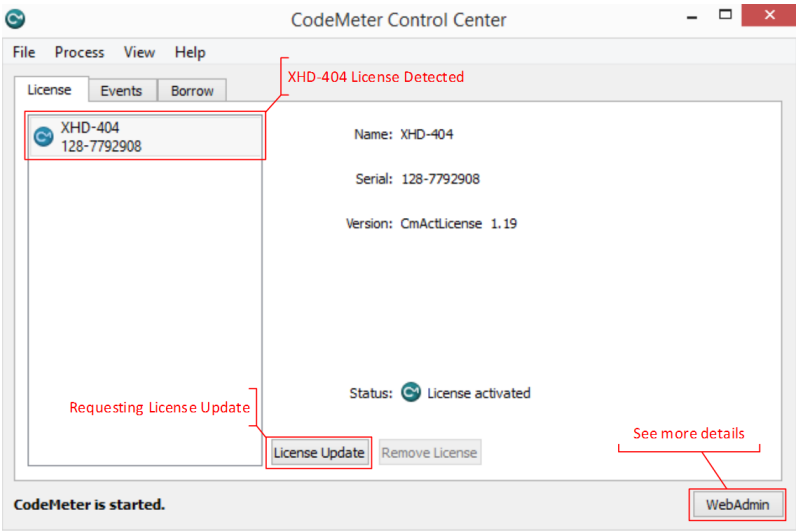


Figure 2.2. CodeMeter Control Center overview for XHD-series license.

3. Click on WebAdmin to see more details.

   This opens a webpage.

4. Navigate to the License pane under Content. (See *Figure 2.3, "WebAdmin License page for XHD-series licenses"*.)

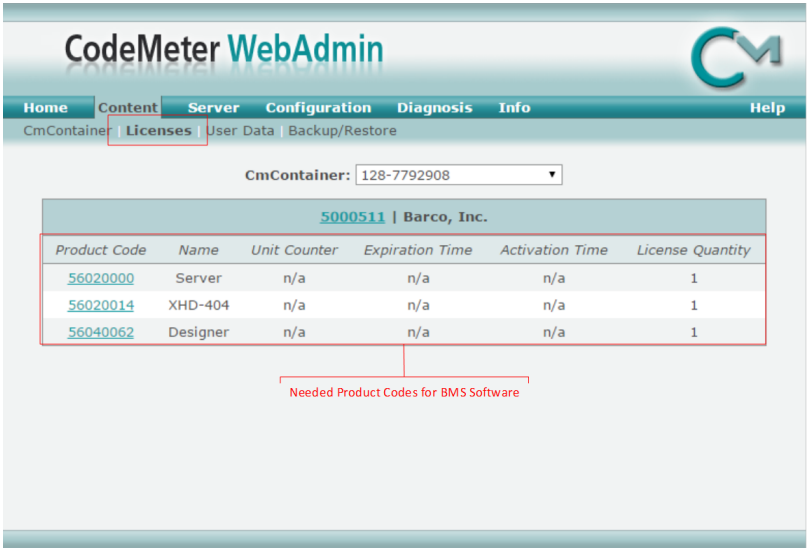

CodeMeter WebAdmin
Home Content Server Configuration Diagnosis Info Help
CmContainer Licenses User Data Backup/Restore
CmContainer: 128-7792908
5000511 | Barco, Inc.
Product Code Name Unit Counter Expiration Time Activation Time License Quantity
56020000 Server n/a n/a n/a 1
56020014 XHD-404 n/a n/a n/a 1
56040062 Designer n/a n/a n/a 1
Needed Product Codes for BMS Software

Figure 2.3. WebAdmin License page for XHD-series licenses

5. XHD-Series licenses must have the Product Codes shown in *Figure 2.4, "XHD-series product codes"* to properly work with Barco Media Server software.

5000511 | Barco, Inc.					
Product Code	*Name*	*Unit Counter*	*Expiration Time*	*Activation Time*	*License Quantity*
56020000	Server	n/a	n/a	n/a	1
56020014	XHD-404	n/a	n/a	n/a	1
56040062	Designer	n/a	n/a	n/a	1

Figure 2.4. XHD-series product codes

Requesting an update for an existing XHD-series license

1. Launch CodeMeter Control Center.
2. Find the XHD-Series License listed in CodeMeter Control Center (See *Figure 2.2, "CodeMeter Control Center overview for XHD-series license."*.)
3. Click **License Update**.
4. Click **Next**.
5. Select **Create License Request**.
6. Select **Extend Existing License**.
7. Check Firm code **5000511** (Barco, Inc.) and click **Next**.
8. Send the resulting *.WibuCmRac* file to Barco.

2.7.4 XDG-100 Designer licensing

This section describes how to check a current license and request an update for an existing XDG-100 license issued by Barco.

Minimum laptop requirements

The XDG-100 Designer may be run on a laptop computer, so long as that laptop meets the following minimum requirements.

Video card:	NVIDIA GeForce GTX850M 4GB DDR3
CPU:	Intel® Core™ i7-4710HQ at 2.50 GHz
RAM:	8 GB DDR3
Screen:	15 in. screen, with 1600×900 resolution
Storage:	256 GB SSD
OS:	Microsoft® Windows® 8.1

Checking current licenses

1. Launch the CodeMeter Control Center.
2. Insert the XDG-100 Designer USB drive in a USB port on your computer.
3. Find the XDG-100 license listed in CodeMeter Control Center (See *Figure 2.5, "CodeMeter Control Center overview for XDG-100 license."*.)

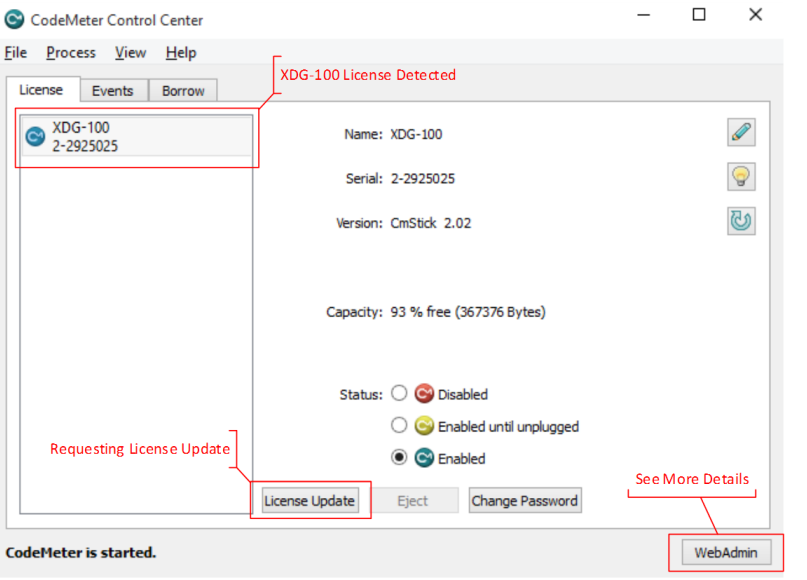


Figure 2.5. CodeMeter Control Center overview for XDG-100 license.

4. Click on WebAdmin to see more details.

   This opens a webpage.

5. Navigate to the License pane under Content. (See *Figure 2.6, "WebAdmin License page for XDG-100 licenses"*.)

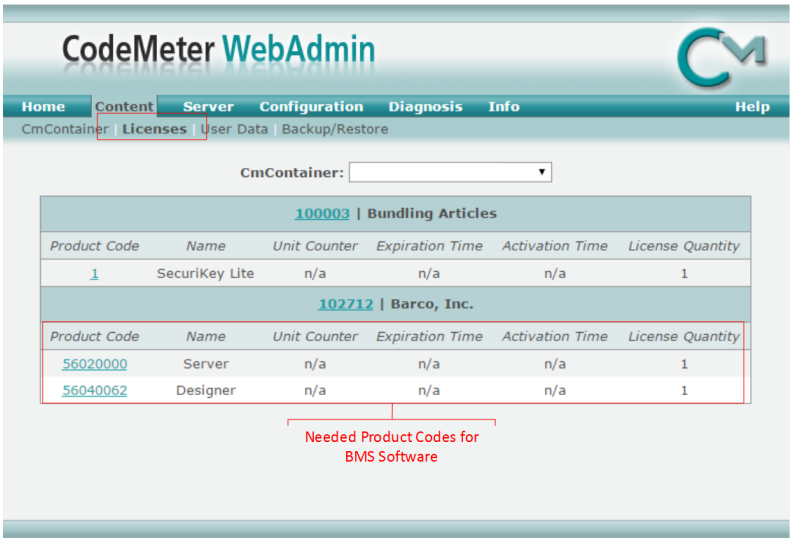


Figure 2.6. WebAdmin License page for XDG-100 licenses

6. XDG-100 licenses must have the Product Codes shown in *Figure 2.7, "XDG-100 product codes"* to properly work with Barco Media Server software.

102712 | Barco, Inc.					
Product Code	*Name*	*Unit Counter*	*Expiration Time*	*Activation Time*	*License Quantity*
56020000	Server	n/a	n/a	n/a	1
56040062	Designer	n/a	n/a	n/a	1

Figure 2.7. XDG-100 product codes

Requesting an update for an existing XDG-100 license

1. Launch CodeMeter Control Center.
2. Insert the XDG-100 Designer USB drive in a USB port on your computer.
3. Find the XDG-100 license listed in CodeMeter Control Center (See *Figure 2.5, "CodeMeter Control Center overview for XDG-100 license."*.)
4. Click **License Update**.
5. Click **Next**.
6. Select **Create License Request**.
7. Select **Extend Existing License**.
8. Check Firm code **102712** (Barco, Inc.) and click **Next**.

9. Send the resulting *.WibuCmRac* file to Barco.

2.8 Shutdown and restart

The Barco Media Server can be shut down and restarted from Windows or by means of the hardware power switches on the front and rear panels of the Barco Media Server box.

Note

X-Agora always opens with the most recently saved data. Remember always to exit X-Agora before shutting down or restarting the Barco Media Server. Upon exiting, X-Agora prompts you to save your work. If you do not save your work in X-Agora before shutting down or restarting the Barco Media Server, some of your work may be lost.

2.8.1 Software shutdown

After saving your work and closing X-Agora, you can shut down the Barco Media Server through Windows.

1. Right-click the Windows icon at the far-left end of the taskbar.
2. Hover the cursor over the **Shut down or sign out** option in the pop-up menu.
3. Select **Shut down** or **Restart**.

Figure 2.8. Windows shutdown menu

2.8.2 Hardware shutdown

The Barco Media Server box can be powered down by means of the power switch, the reset button, or the master power switch. Only the power switch performs a shutdown.

Hardware shutdown options

- Press the power switch on the front panel to shut down the Barco Media Server.

- Press the reset button on the front panel to power off and power on the Barco Media Server.

  The box powers off, without a shutdown procedure, and powers on again. Data may be lost.

- Press the master power switch on the rear panel to power-off the Barco Media Server.

  The box powers off without a shutdown procedure. Data may be lost.

2.9 Restore

Restore the applications, software licenses, and settings on the C: drive with a System Restore, or both restore the applications, software licenses, and settings on the C: drive *and* erase the data on the D: drive with a Full Restore.

2.9.1 System Restore

Use the following steps to perform a System Restore.

1. Plug the USB Recovery drive into one of the external USB 3.0 ports on the Barco Media Server.

   The Barco USB Recovery drive is a USB 3.0 device; you may reduce recovery time by using this drive in a USB 3.0 port.

2. Right-click the Windows icon at the lower left-hand corner of the screen to restart.

   As the system restarts, it displays the Barco logo screen.

3. Press and hold the F8 key to summon the Select Boot Device screen.

4. Select the USB Recovery drive (STT ST3U16SSPS (15000MB)).

   Use the up and down arrow keys on your keyboard, or use your mouse to make selections.

   After the system restarts, the Restore application displays the Barco Media Server Validation screen.

Figure 2.9. Barco Media Server Validation screen

5. Allow the System Restore menu to load.

   The System Restore menu takes a few minutes to load. During this time, a number of small windows appear and disappear. Wait until you see a full-screen menu titled **Barco Media System Restore Menu**.

Barco Media Server System Restore Menu
Please click the appropriate restore option, or use <Tab> on your keyboard to highlight the appropriate restore option and hit <Enter>
System Restore
Exit
Full System Restore
Barco Media Server System Restore v1.0.6

Figure 2.10. Barco Media Server System Restore Menu

6. Select the **System Restore** option or **Exit** to cancel the operation.

If you select System Restore, the system displays the Confirmation screen.

Note

Do not select **Full System Restore**, unless you intend to delete all the data on the D: drive. See *Full System Restore (p.41)*.

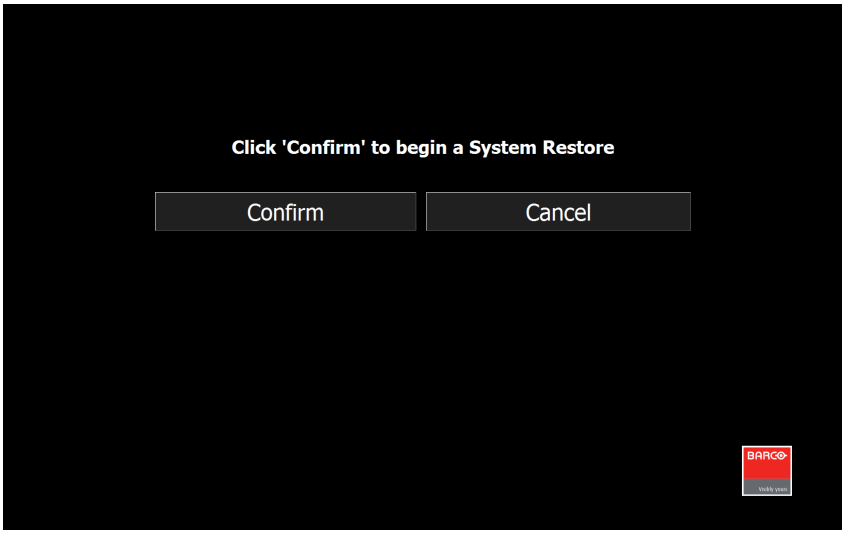


Figure 2.11. Confirmation screen

7. Select **Confirm**, and the Restore begins.
8. Allow the Restore to run.

   The Restore process takes between 10 and 30 minutes. The system displays status throughout the Restore.

Figure 2.12. Sample Status screen

Once the Restore has reached this point (Applying the main volume), the Barco Media Server automatically restarts.

9. Allow a few minutes for the Barco Media Server to reconfigure.

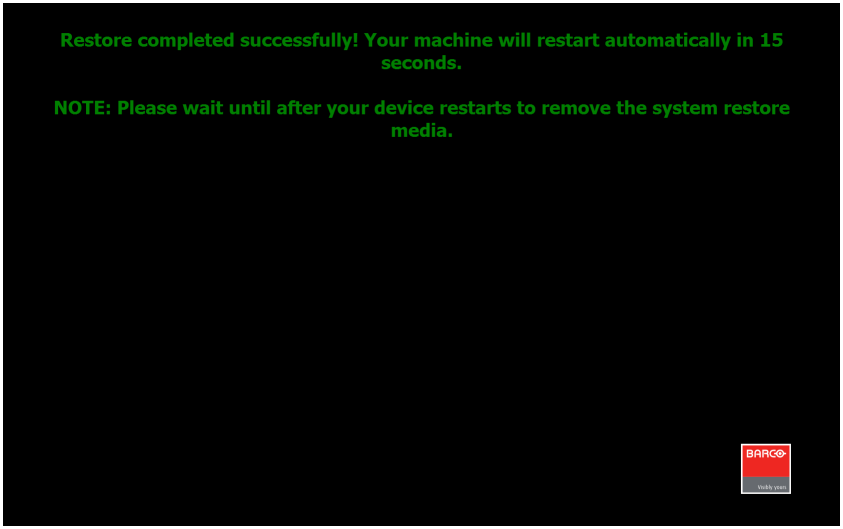

Restore completed successfully! Your machine will restart automatically in 15 seconds.
NOTE: Please wait until after your device restarts to remove the system restore media.

Figure 2.13. Completion screen

After the restoration is complete, you may remove the USB System Restore thumb drive.

2.9.2 Full System Restore

The procedure for a Full System Restore is nearly the same as the procedure for a System Restore. This not only restores the application, software licenses, and settings on the C: drive, but it erases any data on the D: drive, restoring the system to its original condition.

1. Plug the USB Recovery drive into one of the external USB 3.0 ports on the Barco Media Server.

   The Barco USB Recovery drive is a USB 3.0 device; you may reduce recovery time by using this drive in a USB 3.0 port.

2. Right-click the Windows icon at the lower left-hand corner of the screen to restart.

   As the system restarts, it displays the Barco logo screen.

3. Press and hold the F8 key to summon the Select Boot Device screen.

4. Select the USB Recovery drive (STT ST3U16SSPS (15000MB)).

   Use the up and down arrow keys on your keyboard, or use your mouse to make selections.

   After the system restarts, the Restore application displays the Barco Media Server Validation screen.

5. Allow the System Restore menu to load.

   The System Restore menu takes a few minutes to load. During this time, a number of small windows appear and disappear. Wait until you see a full-screen menu titled **Barco Media System Restore Menu**.

6. Select the **Full System Restore** option or **Exit** to cancel the operation.

   If you select Full System Restore, the system displays the Confirmation screen with the warning, "!!CLICKING CONFIRM WILL DELETE ALL CONTENT AND DATA!!".

Note

A Full System Restore deletes all data from the D: drive. If you wish to restore the applications, software licenses, and settings on the C: drive *without* erasing the data on the D: drive, use System Restore. See *System Restore (p.37)*.

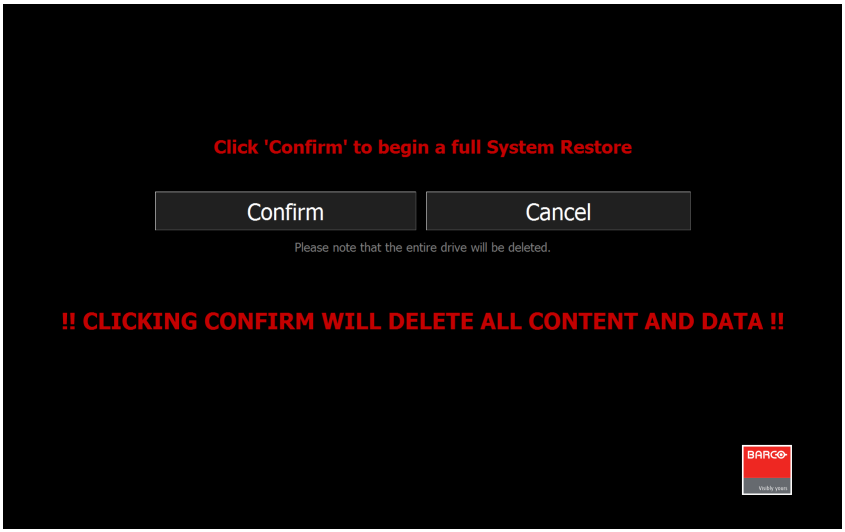

Click 'Confirm' to begin a full System Restore
Confirm
Cancel
Please note that the entire drive will be deleted.
!! CLICKING CONFIRM WILL DELETE ALL CONTENT AND DATA !!
BARCO

Figure 2.14. Barco Media Server Full System Restore Menu

7. Select **Confirm**, and the Restore begins.
8. Allow the Restore to run.

   The Restore process takes between 10 and 30 minutes. The system displays status throughout the Restore.

   Once the Restore has reached this point (Applying the main volume), the Barco Media Server automatically restarts.
9. Allow a few minutes for the Barco Media Server to reconfigure.

2.9.3 Clearing CMOS

If the Barco Media Server hangs or fails to boot after any change to the BIOS settings, press the clear CMOS button to clear the CMOS and reset the motherboard to its default value.

The clear CMOS button is a small red button labelled CLR_CMOS, located near the front end of the PCIe 3.0 x16_4 expansion slot. (In the XHD-402 and XHD-404 media servers, this slot holds the video out card. In the XHD-200 and XHD-400 media servers, this slot is empty.)

Caution

Do not press the CLR_CMOS button during a System Restore, because this will interrupt the restore operation.

Section 3: Hardware

X-Agora runs on various models of Barco Media Server. This chapter describes the hardware configuration of the XHD-200 Series and the XHD-400 Series servers.

Although the XHD-200 Series and XHD-400/2/4 Series servers differ in height, they have the same buttons, switches, LED indicators, and USB 3.0 ports on the front panel.

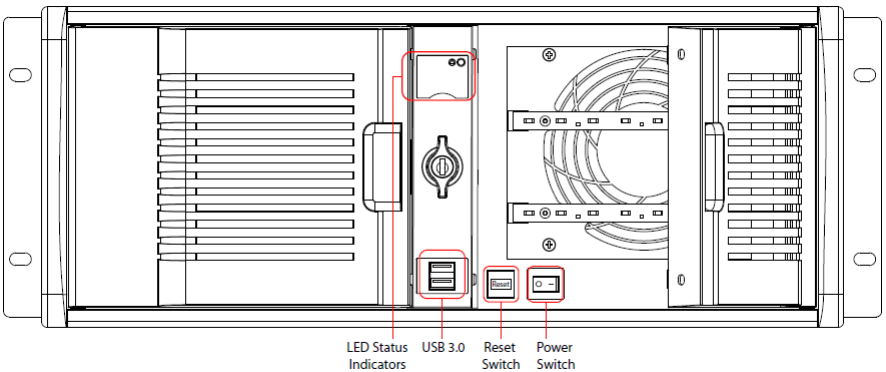


Figure 3.1. XHD-Series server—front panel

3.1 XHD-200 series

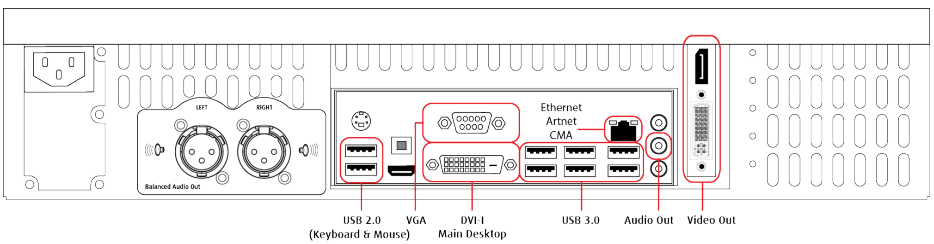


Figure 3.2. XHD-200 server—rear panel

- XHD–200 (2u chassis)
  - Outputs – 2
  - Inputs – 0

3.2 XHD-400 series

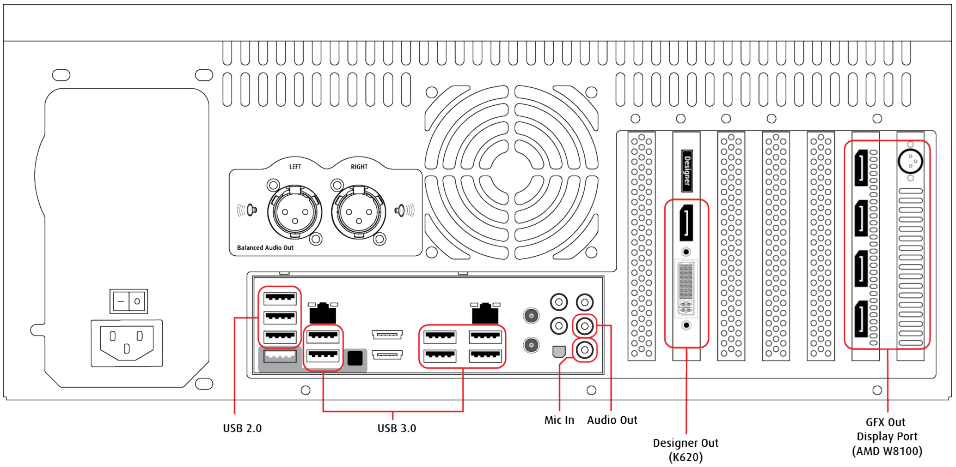


Figure 3.3. XHD-400 server—rear panel

- XHD–400 (4u chassis)
  - Outputs – 4
  - Inputs – 0

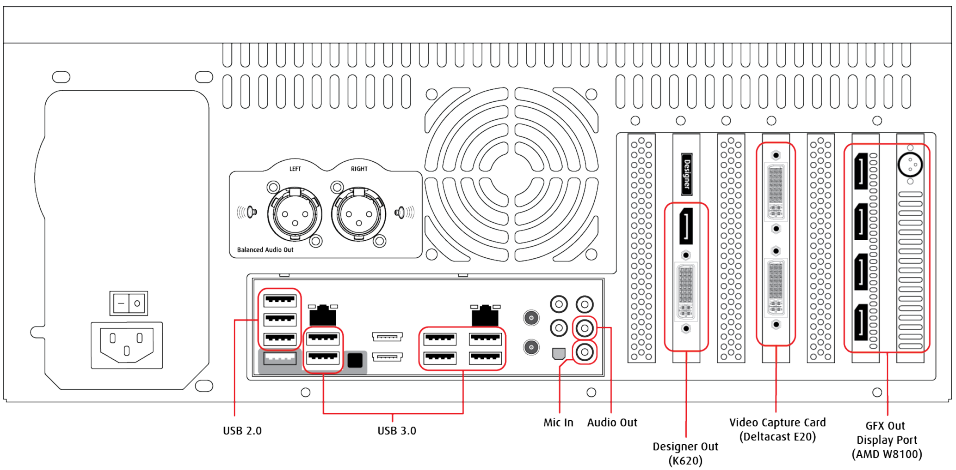


Figure 3.4. XHD-402 server—rear panel

- XHD–402 (same 4u chassis as XHD–400)

- Outputs – 4 DisplayPort 1.2a
- Inputs – 2 single-link DVI capture

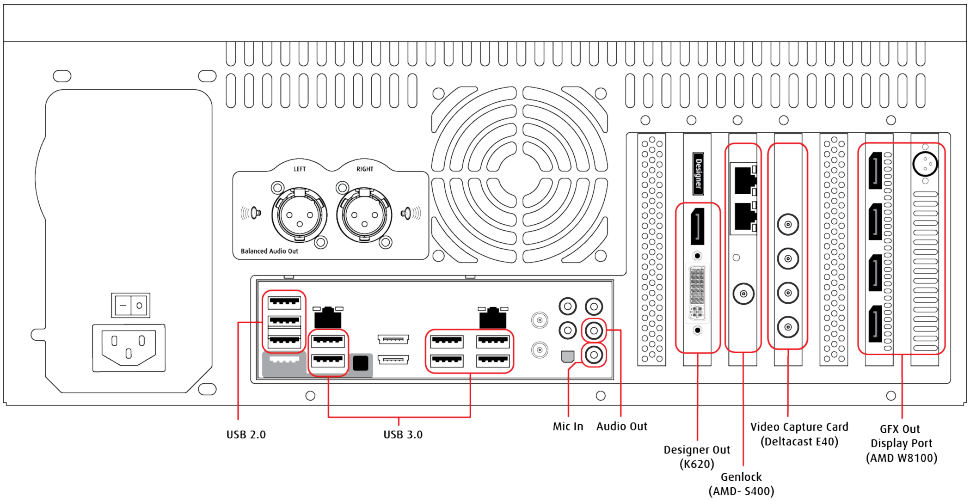


Figure 3.5. XHD-404 server—rear panel

- XHD–404 (same 4u chassis as XHD–400)
  - Outputs – 4 DisplayPort 1.2a
  - Inputs – 4×3G SDI
  - Genlock – synchronization module

Section 4: Software

The X-Agora software suite is a unified software environment designed to facilitate projection mapping project workflow from design to playback and operation.

4.1 Requirements

4.1.1 Hardware

X-Agora machines run Windows Embedded 8.1 x64.

These machines come pre-installed with X-Agora, including a license for the software. To perform X-Agora updates, you must run the X-Agora wizard, which is explained in this guide.

4.1.2 Distributed deployment

If your installation requires the use of multiple X-Agora machines (because of a high number of required outputs or for performance reasons), it is important that all of the machines run the same exact version of the software, to avoid communication problems and feature discrepancies between components.

4.1.3 Network

X-Agora relies on the proper functioning of your network, and makes a few assumptions:

- TCP and UDP communication is open on the network. These protocols are used for small file transfers, clock synchronization, and the communication of interactive signals.
- All X-Agora machines have the same Windows credentials. This ensures that the use of Windows file sharing works for the transfer of media files.
- All X-Agora machines automatically log on to a Windows session at boot time. This ensures that all the necessary applications are running when needed.

You may wish to isolate the X-Agora network from external inputs for security reasons. Please keep in mind that X-Agora uses different network protocols for its proper functioning, and that within the X-Agora network it is recommended to leave all communication open.

4.2 The X-Agora architecture

The X-Agora system operates according to a client-server architecture to allow maximum scalability. A typical X-Agora deployment comprises a Controller PC and multiple Player PCs, connected together as the X-Agora network. The Controller PC runs the X-Agora Server application that manages and coordinates the Player PC clients (all of which run the X-Agora Player and X-Agora Agent applications). For larger venues, the X-Agora architecture can be extended to support additional clients and servers according to project needs.

The X-Agora software suite components include:

- X-Agora
- X-Agora Agent
- X-Agora Player
- X-Agora Server

4.2.1 X-Agora

X-Agora allows you to create a project, import media, assign outputs to player machines and monitor the status of your event while it is running.

This application allows you to work with 2D projects, in which all playback takes place on LED or LCD displays, or with 3D projects, in which you can also use projectors and import your own 3D models.

4.2.2 X-Agora Agent

X-Agora Agent is an application that supports the X-Agora Player application. It is installed on every machine in the X-Agora network to facilitate the server's control of the network and communication between the player and the server.

4.2.3 X-Agora Player

It is as simple as this: *"The player plays your media."*

Everything programmed in X-Agora is made visible or audible by a player.

Note

The X-Agora Player is not capable of media playback on its own. It requires the X-Agora Server and X-Agora Agent applications to coordinate its actions.

Hardware and software licenses protect each X-Agora Player with regard to managing the number of outputs that can be connected to a physical machine and validating the number of live input devices that can be used.

4.2.4 X-Agora Server

X-Agora Server is a Windows service installed on the controller PC to coordinate all of the X-Agora elements on the network. Every application in the X-Agora network operates as a client of X-Agora Server, allowing you to remotely monitor and maintain your X-Agora network from the controller PC.

The X-Agora Server—

- Coordinates all nodes on the X-Agora network.
- Acts as a centralized logger and message relay carrier between players.
- Hosts all media files.
- Synchronizes all players with updates to the media and virtual scene.

This documentation can be accessed from within X-Agora by pressing the F1 key. You can also press F1 in each pane to display its documentation.

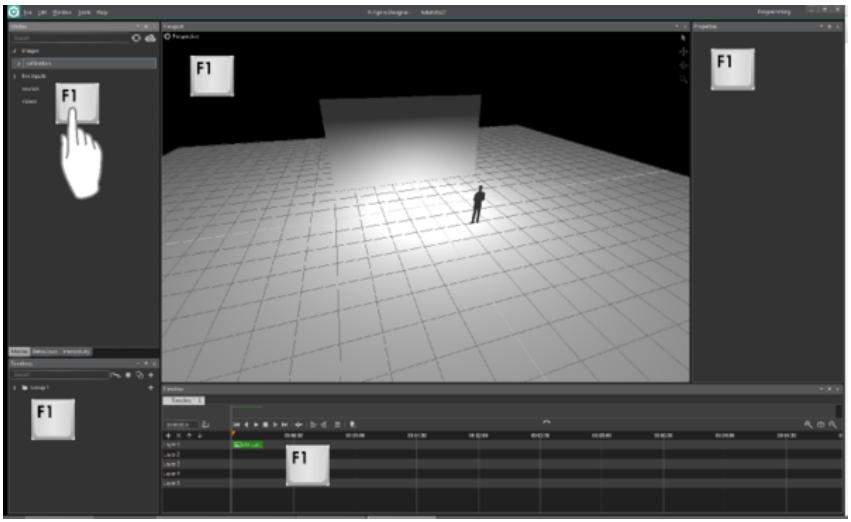


Figure 4.1. X-Agora F1 Help

4.3 Getting started—Install, Uninstall, and Update

4.3.1 X-Agora Wizard

1. Launch **X-Agora Installer.exe**.
2. Select **Next**.

Figure 4.2. Launch the installer, and select **Next**

3. Select **Accept** to accept the license; then select **Next**.

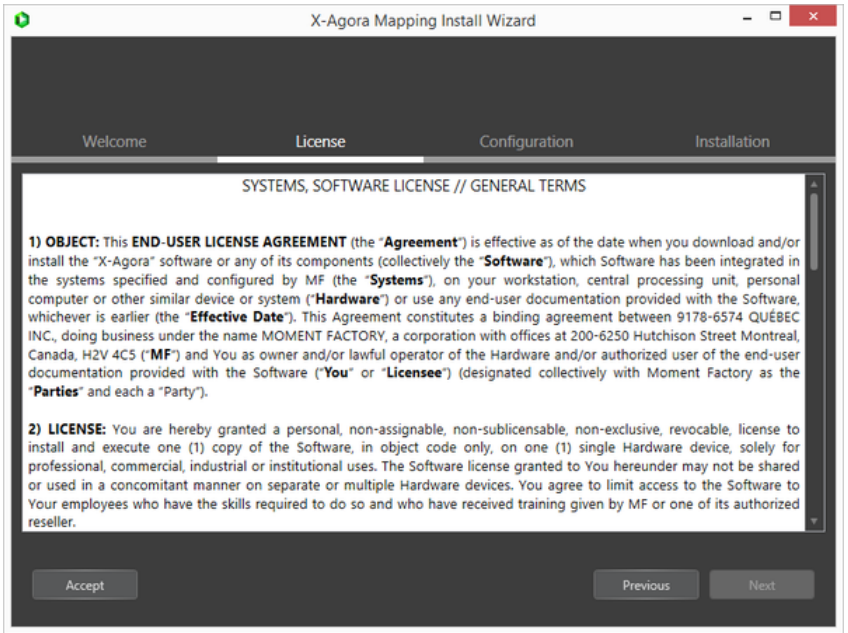

X-Agora Mapping Install Wizard
Welcome
License
Configuration
Installation
SYSTEMS, SOFTWARE LICENSE // GENERAL TERMS
1) OBJECT: This END-USER LICENSE AGREEMENT (the "Agreement") is effective as of the date when you download and/or install the "X-Agora" software or any of its components (collectively the "Software"), which Software has been integrated in the systems specified and configured by MF (the "Systems"), on your workstation, central processing unit, personal computer or other similar device or system ("Hardware") or use any end-user documentation provided with the Software, whichever is earlier (the "Effective Date"). This Agreement constitutes a binding agreement between 9178-6574 QUÉBEC INC., doing business under the name MOMENT FACTORY, a corporation with offices at 200-6250 Hutchison Street Montreal, Canada, H2V 4C5 ("MF") and You as owner and/or lawful operator of the Hardware and/or authorized user of the end-user documentation provided with the Software ("You" or "Licensee") (designated collectively with Moment Factory as the "Parties" and each a "Party").
2) LICENSE: You are hereby granted a personal, non-assignable, non-sublicensable, non-exclusive, revocable, license to install and execute one (1) copy of the Software, in object code only, on one (1) single Hardware device, solely for professional, commercial, industrial or institutional uses. The Software license granted to You hereunder may not be shared or used in a concomitant manner on separate or multiple Hardware devices. You agree to limit access to the Software to Your employees who have the skills required to do so and who have received training given by MF or one of its authorized reseller.
Accept
Previous
Next

Figure 4.3. Accept the license, and select **Next**

4. Select either **Install**, **Uninstall**, or **Update** in the drop-down menu; then select **Next**.

   If the software is already installed, select **Uninstall** or **Update** in the drop-down menu and select **Next**. If the software is not already present, the Installation Wizard automatically chooses the Install option. You can choose where to put the software and also where to put the project files. By default, the Installation Wizard picks the disk partition with the most free space as the target for project files.

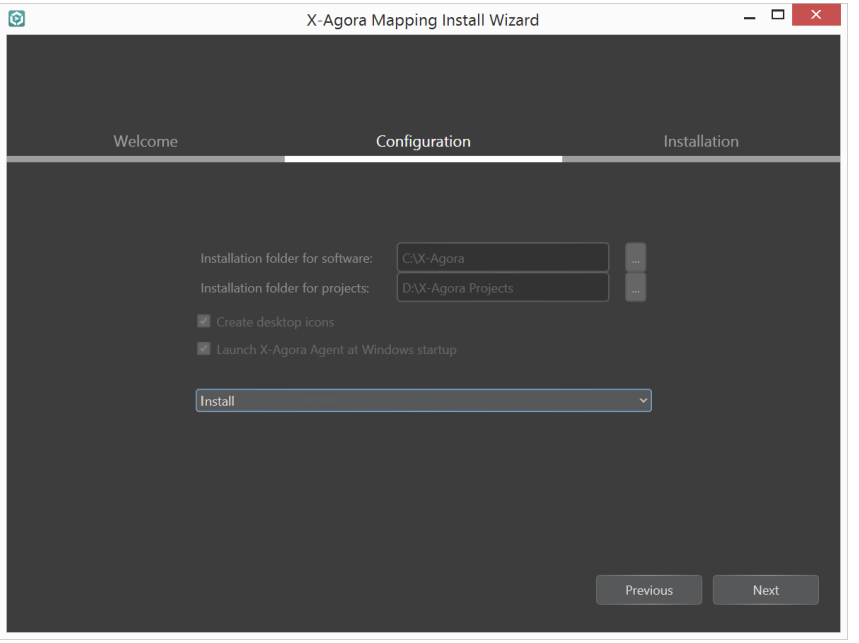


Figure 4.4. Start the Installation or Update

5. Select **Next** to start the Installation or Update.

   You may have to confirm to some prompts for X-Agora requirements.

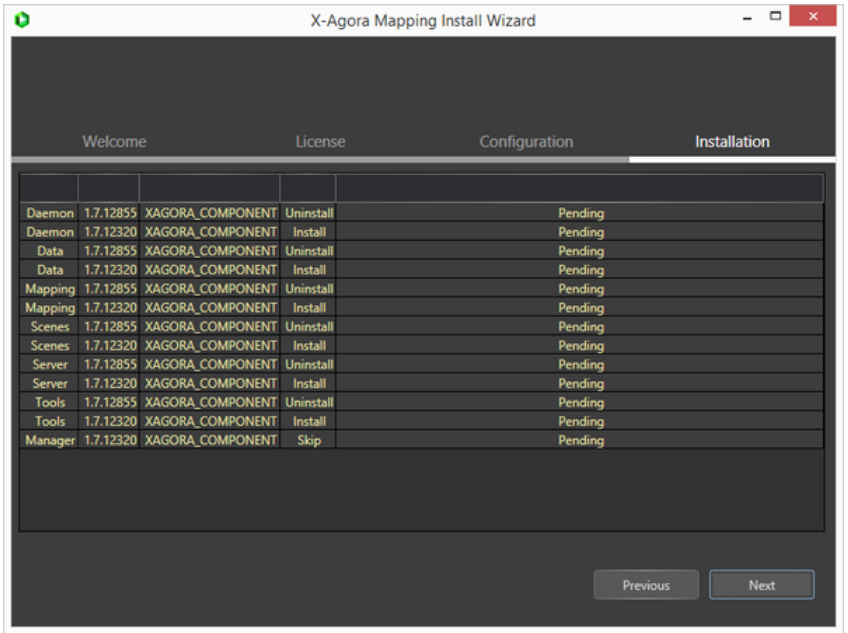


Figure 4.5. X-Agora

6. Select **Close** to exit the Installation Wizard.

Note

Uninstalling the software removes all the files that were placed on the computer at installation: binary files, some configuration files, and the demo project. Extra files such as your own projects or additional configuration files are not removed.

Note

Updating an installation is possible for upgrades and also downgrades, using the same steps.

4.4 Network setup

Every machine in your setup can be a Player or the Master Player.

Also, as explained in *Remote mode (p.144)*, it is possible to connect remotely to the Master Player (e.g., with your laptop), so you can modify your project remotely.

To set up a project on multiple machines, you need a Server machine and at least one Player machine.

1. On a Server machine, open X-Agora Server.

   The process opens in the background, and an icon appears in the notification area on the taskbar.

2. On a Player machine, open X-Agora Agent and follow the steps in *Configuring Agent (p.54)*.

Every machine in your setup can be a Player or the Master Player.

It is also possible to connect remotely to the Master Player (e.g., with your laptop), so you can modify your project remotely.

4.5 Configuring Agent

X-Agora Agent is configured by default to connect to its local X-Agora Server service. When changing the Master Player in your project, all the required instances of X-Agora Agent point to the new Master Player. You can also change the default configuration manually.

To change the default configuration manually—

1. Launch **Agent** as an administrator.

   (Double-click on the **Agent icon** in the notification area.)

2. Select the **Configuration tab**.

3. Enter the X-Agora Player Executable path (if not entered already).

   The default path is *C:\X-Agora\xagora-projection\xframe-3d.exe*.

4. Enter the Media Server Directory path (if not entered already).

   The default path is *C:\X-Agora\xagora-projection*.

5. Enter the Master Player type:

   - For a local Master Player, select **Manual**, enter address **127.0.0.1** or **'localhost'**, use **Port 5000**, and select **Connect**.
   - For a remote Player, select the address of the server, use **Port 5000**, and select **Connect**.

6. Select **Save** to save the settings parameters.

   X-Agora asks you to restart.

7. Restart X-Agora Agent.

Note

If remote share has not been configured prior to X-Agora installation, enter User and Password to access the remote machine and select **Connect To Remote Share**.

4.6 Launching X-Agora

1. Launch X-Agora Server by selecting the **X-Agora Server shortcut** from the Desktop or from the Start Menu.
2. Launch X-Agora by selecting the **X-Agora shortcut** from the Desktop or from the Start Menu.

Note

X-Agora Server *must* be running for X-Agora to launch.

Note

The Windows service *xagoraServer* MUST be running for X-Agora to launch. It is enabled by default and launched automatically at Windows boot time. Also make sure that you have the proper license for running the software.

4.7 X-Agora interface

Figure 4.6, "X-Agora start screen" shows the X-Agora start screen. From this screen, you can open a new project or an existing project by clicking either **New Project…** or the name of an existing project, for example **xagoraShape**.

Figure 4.6. X-Agora start screen

4.7.1 Parts of the interface

X-Agora opens the project, defaulting to the workflow layout that was in use the last time the project was open. In the case of a new project, X-Agora opens the Study layout. *Figure 4.7, "X-Agora Programming workflow layout"* shows an existing project open in the Programming workflow layout.

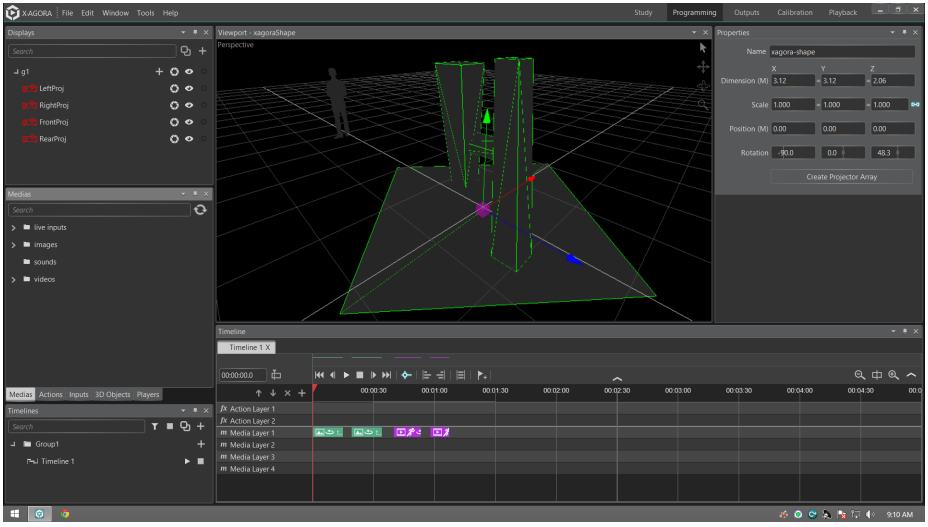


Figure 4.7. X-Agora Programming workflow layout

The interface comprises a menu bar, divided into left-hand and right-hand halves, and a workspace containing various panes.

Menu bar

The left-hand side of the menu bar has five menus: File, Edit, Window, Tools, and Help. From the File menu you can select…

New…	to open a new project
Open	to open an existing project
Save	to save a project
Save As…	to save a project with a different name
Import…	to import a file into a project
Export…	to export a project as a 3D model (*.fbx)
Connect to a Remote Server	to connect to a remote server
Close	to close a project
Exit	to exit X-Agora

From the Edit menu you can either undo or redo changes to a project.

From the Window menu you may choose which panes to display in the workspace. See *Workspace (p.58)* for a brief description of the Window menu panes.

From the Tools menu you may open any of the listed tools.

Content Production

Projection Study Wizard

X-Agora Media Encoder

Export Projectors Textures

Logs

From the Help menu you may select **About** to open the X-Agora splash screen, which displays the copyright and the software release number. You can also select **Help** (or press the **F1** key) to open the *X-Agora Designer User Guide*.

Workflow layouts

The right-hand side of the menu bar allows you to choose from among the five workflow layouts in X-Agora.

Study: Study, also called Projection Study, is mostly used in the initial phases of a production. It is the layout best suited for creating your 3D scene and arranging your displays. You can create multiple display configurations, and produce a study document to detail and evaluate each configuration. If there is no need to produce such documents,

you should still use the Projection Study layout to create your scene and displays, because this layout has features that may help people working at a more technical level: technical directors, architects, and integrators.

Programming: The Programming tool allows you to build content Timelines. X-Agora allows you to create as many Timelines as you want in each X-Agora project. Because it was designed for large-scale installations, X-Agora also allows you to playback multiple Timelines simultaneously. Often, in large-scale installations, there are multiple screen spaces, and often it is easier to compartmentalize content for each screen space on a dedicated Timeline.

Outputs: Use the Outputs layout to connect individual projectors and displays to the physical outputs of the graphic cards on your Player computers. The Outputs layout also allows you to tweak settings, such as the position of windows and the amount of antialiasing.

Calibration: Use the Calibration layout to calibrate individual projectors when on site. X-Agora features four projection calibration tools, some of which can be used in conjunction with each other.

Playback: The Playback layout is meant to play your show. It features a simplified interface for streamlined playback, in which Timelines are not editable to avoid accidental changes. It also features the control room view of player outputs, allowing you to monitor the output and performance of your player machines during operation.

Workspace

The workspace is divided into several panes. You may show or hide any of the panes by selecting or deselecting them in the Window menu. The central pane is the Viewport. The Viewport pane is where most manipulation and visualization of your 3D scene occurs.

Displays pane: The Displays pane allows you to adjust the properties of projectors and screens to the real-world constraints of your project.

Media pane: X-Agora supports various types of video, image, sound and real-time media formats (such as particle systems and live-feeds). See *Supported 3D, audio, image, and video formats (p.206)*. The Media pane allows you to import, preview, and refresh media.

Timelines: The Timelines pane contains all the Timelines and Timeline Groups in a given scene. Do not confuse the Timelines pane with the Timeline pane, in which you assemble media assets to compose a show or multimedia installation.

Actions pane: Actions give you real-time tools to go beyond basic video and sound playback. They make it possible to add real-time visual effects to your Timelines, control external systems such as Art-Net lighting fixtures, and move 3D objects in the scene.

3D objects pane: The 3D objects pane provides a list of all the 3D objects in a scene. It also allows you to select them individually in order to highlight them in the Viewport and expose their parameters in the Properties pane.

Timeline pane: The Timeline pane displays the layered content of one timeline. Do not confuse the Timeline pane with the Timelines pane, which contains all the Timelines and Timeline Groups in a given scene. Use the Timeline pane to compose the show or multimedia installation by assembling media assets in time. Create as many Timelines as you want, and add video, image, sound, or real-time graphics in layers.

Properties pane: The Properties pane gives access to all user-editable elements. To access the properties of any user-interface element, click on the element to open its Properties pane.

Inputs: The Inputs pane allows you to create open sound control (OSC) and tangible user interface object (TUIO) inputs that can then be used to control real-time media elements in your project.

Viewport: The Viewport pane provides up to four distinct views of the 3D scene in order to facilitate viewing and moving 3D objects and displays. Click on the **Views Template** button, in the top right-hand corner of the Viewport pane, to change the number and layout of views.

Settings pane: The Projection study section of the Settings menu provides access to key features of the Projection Study Tool.

4.7.2 The *X-Agora Designer User Guide*

The *X-Agora Designer User Guide* documents the panes, tools, and workflow layouts in X-Agora. You may access this documentation from within X-Agora by selecting the Help menu from the left-hand side of the menu bar and selecting Help from the Help menu. You may also access this documentation by pressing the **F1** key. With your cursor in any pane, you can press the **F1** key to display the documentation for that pane.

Appendix A: Specifications

This appendix contains specifications for Barco Media Servers and specifications and pinouts for standard connectors.

A.1 Barco Media Server specifications

Specification	XHD-200 Series	XHD-400 Series
Channel outputs	1× DP 1.2, 1× DVI-D	4× DP 1.2
Designer outputs	–	1× DVI, 1× DP 1.2
Output resolution	Max. 2× HD at 60 fps	Max. 1× 4K at 60 fps, 4× HD at 60 fps
Video layers	Max. 4× HD	Max. 2× 4K, 8× HD
SMPTE input	Mini Jack	Mini Jack
Capture cards	–	• XHD-400: none • XHD-402: 2× Dual-link DVI-D • XHD-404: 4× 3G SDI
EDID management	Software	Software
Audio output	Balanced Audio XLR Connectors	Balanced Audio XLR Connectors
USB	4× USB 3.0, 2× USB 2.0	8× USB 3.0, 4× USB 2.0
Input voltage	100 V AC, 220 V AC	100 V AC, 220 V AC
Networking	1× Gigabit Ethernet	2× Gigabit Ethernet
Storage	256G SSD	512G SSD
Dimensions	• Width: 48 cm (19.0 in) • Length: 28 cm (11 in) • Height: 9 cm (3.5 in)	• Width: 48 cm (19.0 in) • Length: 42 cm (16.6 in) • Height: 18 cm (7 in)
Weight	6.4 kg (14 lbs.)	13.6 kg (30 lbs.)
Shipping weight	7.3 kg (16 lbs.)	14.9 kg (33 lbs.)
Warranty	Full one-year parts and labor standard, extended warranty and support available.	Full one-year parts and labor standard, extended warranty and support available.

Table A.1. Barco Media Server specifications

A.2 Standard connection specifications

Specification	Description

Main (DisplayPort) and Extended (DVI) Desktop	• Display Connectors: DVI-I DL and DP 1.2
	• Maximum Simultaneous Displays: 2 direct, 4 DP 1.2 Multi-Stream
	• Resolution:
	  • 3,840×2,160 at 60 Hz Max DP 1.2 Resolution
	  • 2,560×1,600 at 60 Hz Max DVI-I DL Resolution
	  • 1,920×1,200 at 60 Hz Max DVI-I SL Resolution
	  • 2,048×1,536 at 85 Hz Max VGA Resolution
	• Memory Bandwidth: 29.0 GB/s
	• Memory Interface: 128-bit
	• GPU Memory: 2 GB DDR3
	• Maximum Power Consumption: 45 W

Video Outputs (DisplayPort)	• Four Standard DisplayPort outputs
	• DisplayPort 1.2a support, including Adaptive-Sync and HBR2
	• Resolution:
	  • 4,096×2,160 Maximum DisplayPort 1.2a resolution
	  • 2,560×1,600 Maximum DisplayPort 1.1 resolution
	• PCIe® 3.0 compliant, ×16 bus interface
	• 8-GB GDDR5 memory
	• 256-bit memory interface
	• Up to 160 GB/s bandwidth
	• Less than 150-W maximum power consumption

Genlock	• Synchronization to external sources
	• Clock-accurate synchronization
	• BNC connector for receiving and synchronizing video input source, including:
	  • PAL & NTSC SD video black burst
	  • HDTV tri-level sync
	  • TTL
	  • Sync signals on SDI

Specification	Description

DVI video capture	• DVI-I (DL) connector
	  • Input channels: 2
	  • Output channels: 0
	• Supports HDMI, DVI, and composite video capture
	• PCIe ×4 half size plug-in card (110 mm × 170 mm)

SD/HD/3G SDI video capture	• SD/HD/3G SDI on BNC connector
	  • Input channels: 4
	  • Output channels: 0
	• 6G Ready (via future firmware upgrade)
	• PCI Express: 4-lane PCIe 2.0

Table A.2. Standard connection specifications

A.3 Standard connector pinouts

A.3.1 DisplayPort connector pinouts

Figure A.1, "DisplayPort connector" illustrates the DisplayPort connector.

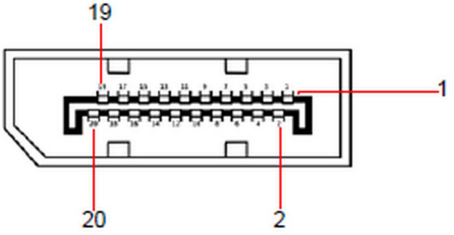


Figure A.1. DisplayPort connector

Table A.3, "DisplayPort connector pins" lists the DisplayPort connector pinouts.

Pin	Signal	Pin	Signal
1	ML_Lane 0 (p)	11	GND
2	GND	12	ML-Lane 3 (n)
3	ML_Lane 0 (n)	13	CONFIG1 (connected to Ground)
4	ML-Lane 1 (p)	14	CONFIG2 (connected to Ground)
5	GND	15	AUX CH (p)
6	ML_Lane 1 (n)	16	GND
7	ML-Lane 2 (p)	17	AUX CH (n)
8	GND	18	Hot Plug Detect
9	ML_Lane 2 (n)	19	Return (return for power)
10	ML_Lane 3 (p)	20	DP_PWR Power for connector (3.3 V, 500 mA)

Table A.3. DisplayPort connector pins

A.3.2 DVI connector pinouts

Figure A.2, "DVI connector" illustrates the DVI connector.

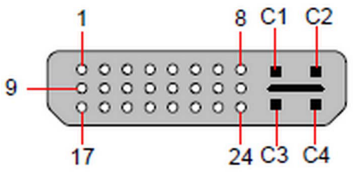


Figure A.2. DVI connector

Table A.4, "DVI connector pins" and *Table A.5, "MicroCross pins"* list the DVI connector pinouts. Please note:

- TMDS = Transition Minimized Differential Signal
- DDC = Display Data Channel

Pin	Signal	Pin	Signal
1	TMDS Data 2–	13	TMDS Data 3+
2	TMDS Data 2+	14	+5V Power
3	TMDS Data 2/4 Shield	15	GND (for +5V)
4	TMDS Data 4–	16	Hot Plug Detect
5	TMDS Data 4+	17	TMDS Data 0–
6	DDC Clock	18	TMDS Data 0+
7	DDC Data	19	TMDS Data 0/5 Shield
8	Analog Vertical Sync	20	TMDS Data 5–
9	TMDS Data 1–	21	TMDS Data 5+
10	TMDS Data 1+	22	TMDS Clock Shield
11	TMDS Data 1/3 Shield	23	TMDS Clock +
12	TMDS Data 3–	24	TMDS Clock –

Table A.4. DVI connector pins

Pin	Signal	Pin	Signal
C1	Analog Red Video	C4	Analog Horizontal Sync
C2	Analog Green Video	C5	Analog Common Ground Return
C3	Analog Blue Video	–	–

Table A.5. MicroCross pins

A.3.3 Ethernet connector pinouts

Figure A.3, "Ethernet connector" illustrates the Ethernet connector.

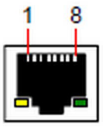


Figure A.3. Ethernet connector

Table A.6, "Ethernet connector pins" lists Ethernet connector pinouts.

Pin	Pair	Color	10/100 Base-T – RJ45 port description	1000 Base-T – RJ45 port description
1	3	white/green	TXD+	TX0+
2	3	green	TXD–	TX0–
3	2	white/orange	RXD+	RX0+
4	1	blue	–	TX1+
5	1	white/blue	–	TX1–
6	2	orange	RXD–	RX0–
7	4	white/brown	–	RX1+
8	4	brown	–	RX1–

Table A.6. Ethernet connector pins

Appendix B: Replacing a power-cord cap

The Barco Media Server ships with an IEC power cord. Different locations (even within the same country) may require a different power cord cap to connect the server to a power outlet. Because of the variety of power cord caps used worldwide, Barco cannot make specific recommendations for the power cord cap. Contact a local authority for the type of power cord cap needed. When installing the power cord cap, note that the cores in the mains lead are colored according to the following code:

- green and yellow = earth
- blue = neutral
- brown = live

B.1 Installing a Line Cord Cap – U.K. Only

In the United Kingdom, core colours in the mains lead of this equipment may not correspond with the coloured markings identifying the terminals in the fixture's plug. In that case, install a line cord cap according to the following code:

- Connect the green and yellow core to the plug terminal marked with the letter "E," or by the earth symbol ⏚ or coloured green, or green and yellow.
- Connect the blue core to the terminal marked with the letter "N" or coloured black.
- Connect the brown core to the terminal marked with the letter "L" or coloured red.

Warning

Class 1 equipment – This equipment must be earthed.

B.2 Vatic Fitter Heads Information – Danmark

Advarsel: Beskyttelse mod elektrisk chock.

Vigtigt!

Lederne med gul/groen isolation maa kun tilsluttes en klemme maerket ⏚ eller ⏚.

Appendix C: AMD FirePro™ Control Center

C.1 Using Dedicated Fullscreen

Using Dedicated Fullscreen assures optimal video playback by taking full control of the GPU and bypassing desktop composition similar to what they do in video games. However, to use that mode, all outputs must be set in an Eyefinity Group. This section explains how to setup an Eyefinity Group using the AMD FirePro Control Center and how to manage the Eyefinity Group inside the X-Agora.

C.2 Setting up an Eyefinity Group

1. Right-click on **Desktop** and select **AMD FirePro Control Center**.
2. Expand **AMD Eyefinity Multi-Display** and click on the **Create Eyefinity Display** group.

Figure C.1. "Create Eyefinity Display Group"

3. Click on **Use a new arrangement**.

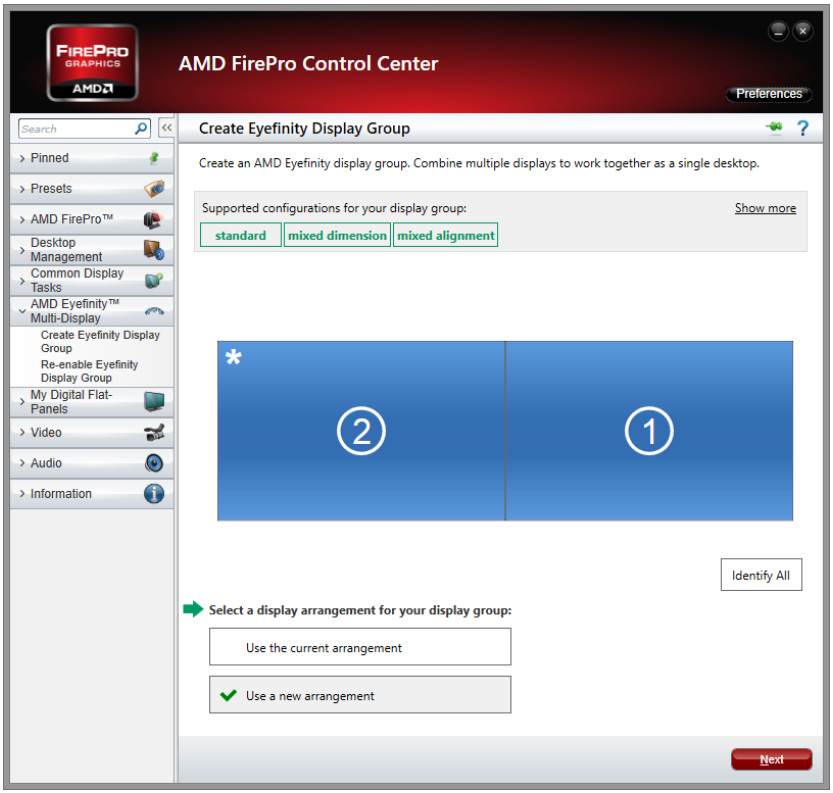


Figure C.2. Use a new arrangement

4. Select the screen from which you want to create the Eyefinity group and click on **Next**.

   The other screens will be disabled.

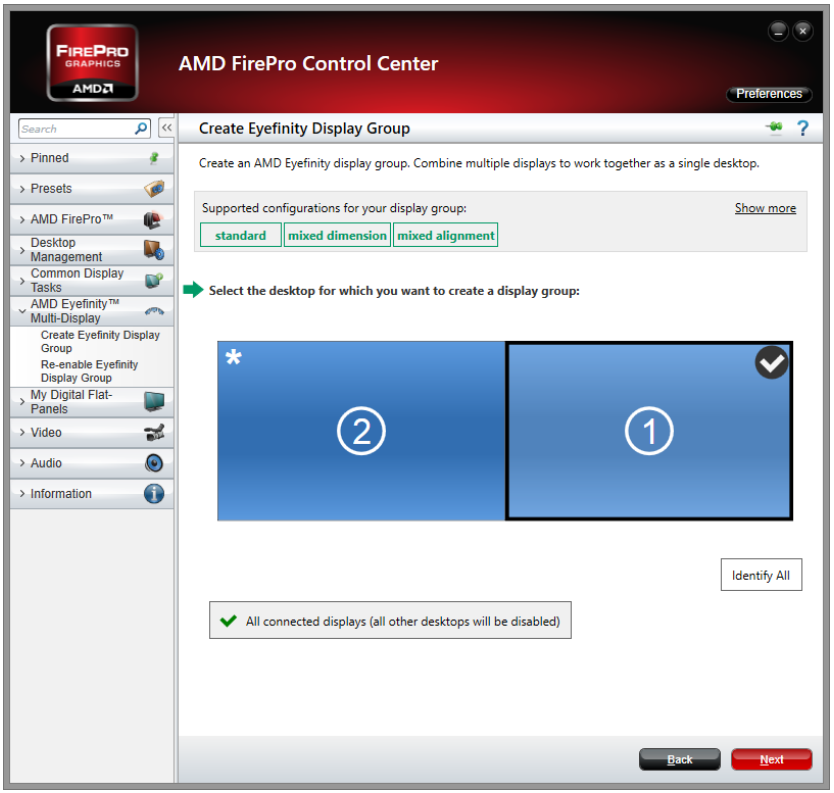


Figure C.3. Create the Eyefinity group

5. Select the layout type—for now, X-Agora supports only horizontal layouts (2x1, 3x1, 4x1, etc.)—and click on **Next**.

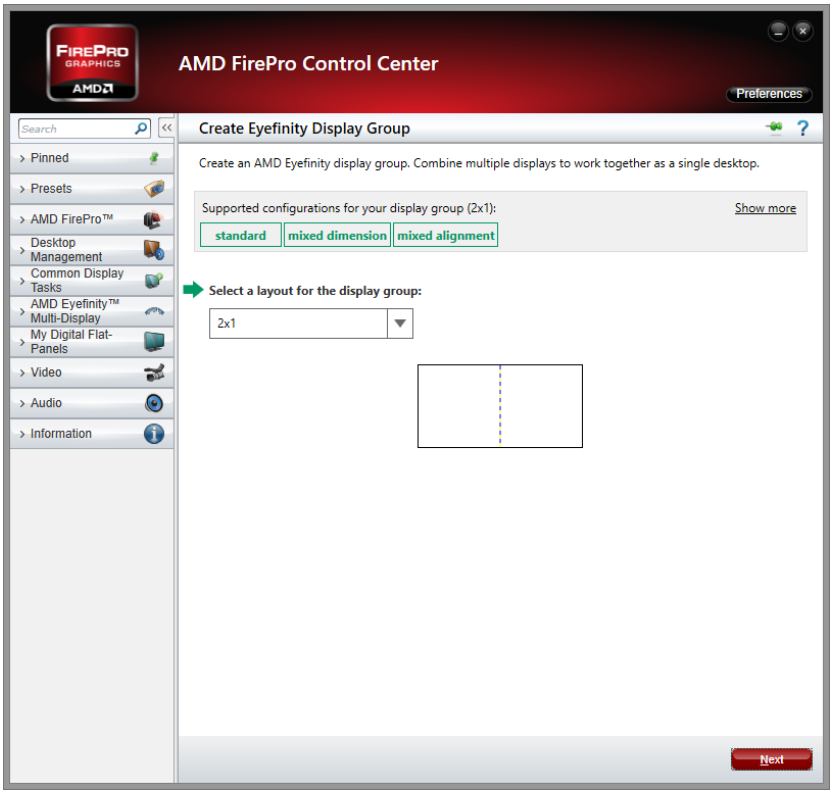


Figure C.4. Select a group layout

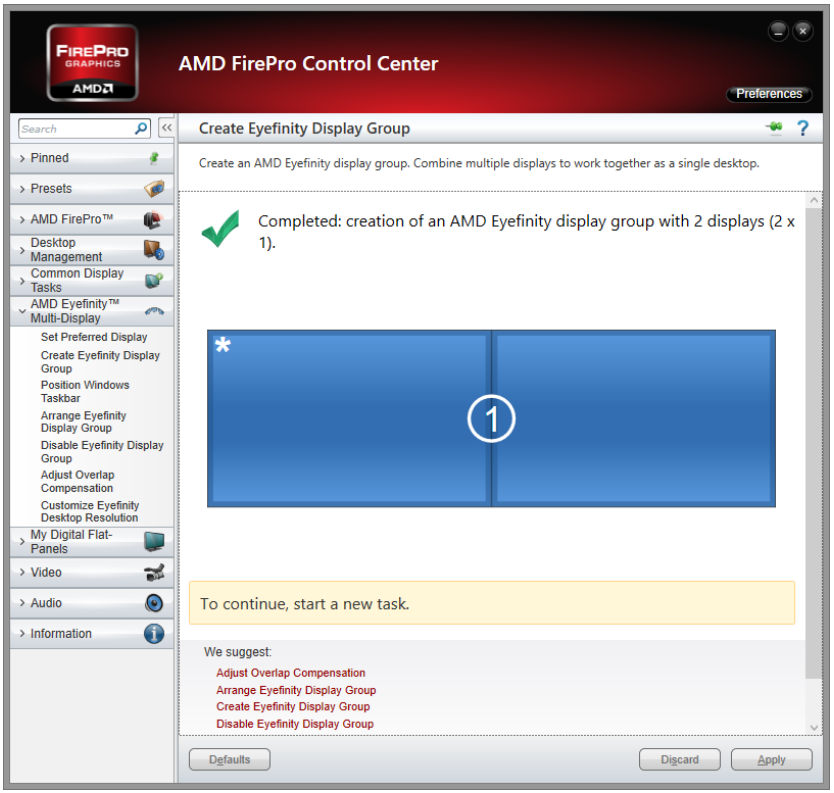


Figure C.5. Display group complete

6. Click on **Next** twice.

   The Eyefinity group should now span across multiple screens, as shown in *Figure C.6, "Eyefinity group spanning multiple screens"*.

Figure C.6. Eyefinity group spanning multiple screens

7. If the screens are not in the proper order, click on **Arrange Eyefinity Display Group** and follow the screen indications to set up the correct screen order.

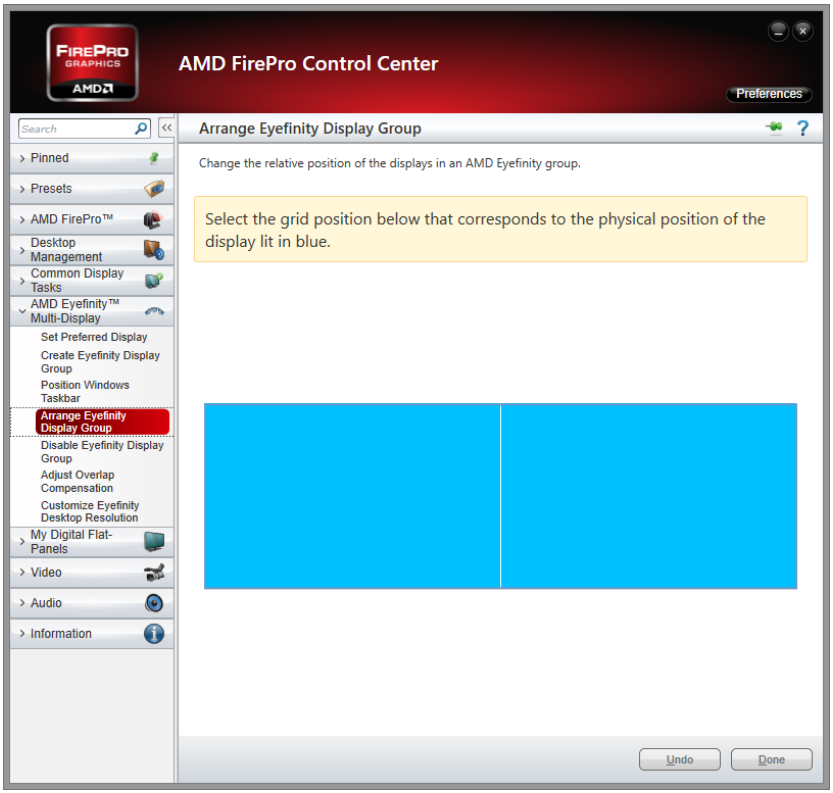


Figure C.7. "Arrange Eyefinity Display Group"

C.3 Disable Eyefinity Group

To disable the Eyefinity Group, click on **Disable Eyefinity Group** in the AMD Eyefinity Multi-Display menu.

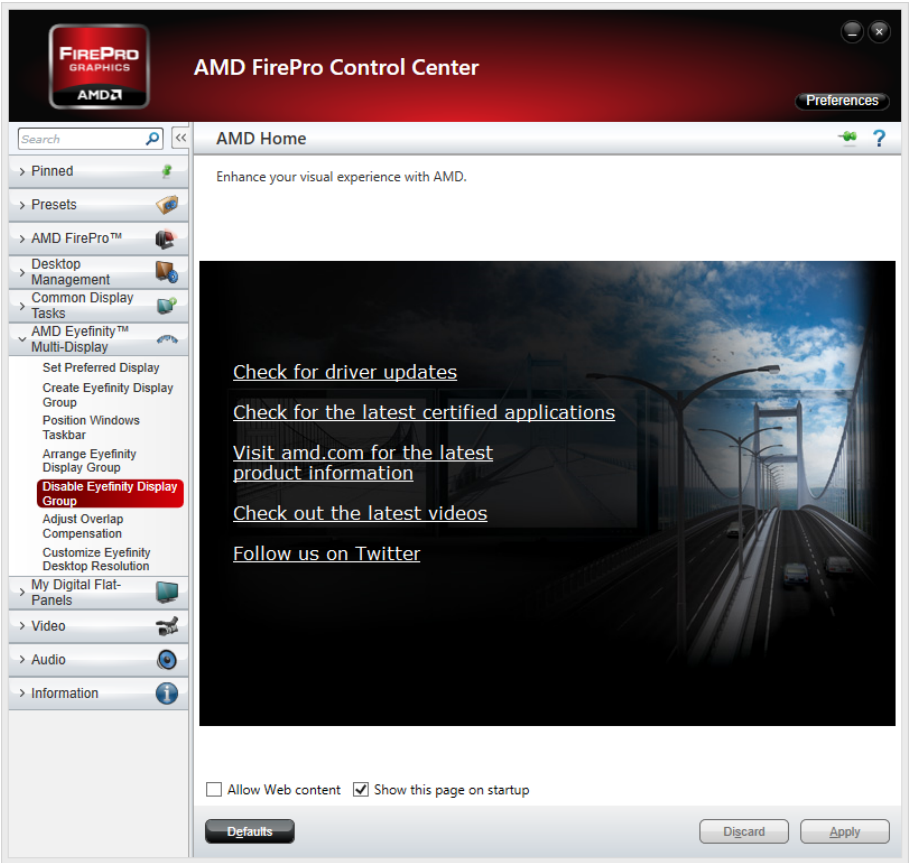


Figure C.8. "Disable Eyefinity Display Group"

C.4 Manage Eyefinity Group in Designer

In X-Agora, an Eyefinity Group is considered as one display so using the Identify Monitors button shows only one large number for the group. The displays that are part of the Eyefinity Group, however, are also identified individually with smaller numbers from 1 to 6, depending of the number of displays in the group.

Figure C.9. Two screens in one Eyefinity group

If the X-Agora Player is in Dedicated Fullscreen, the Eyefinity group is also represented by a rectangle that spans across the correct number of displays in the group. In the following screenshot, the group spans across two outputs:

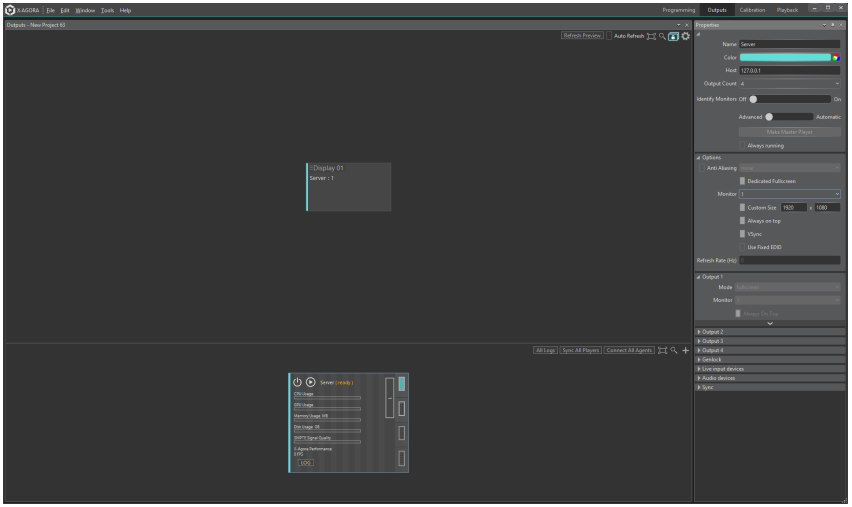


Figure C.10. Eyefinity group spanning two outputs

Appendix D: EDID management

Extended display identification data (EDID) is managed through either the AMD FirePro™ Control Center or the NVIDIA Control Panel.

D.1 Removing an emulated EDID through the AMD FirePro™ Control Center

1. Right-click anywhere on the desktop to summon the desktop menu.
2. Click on **AMD FirePro Control Center**.

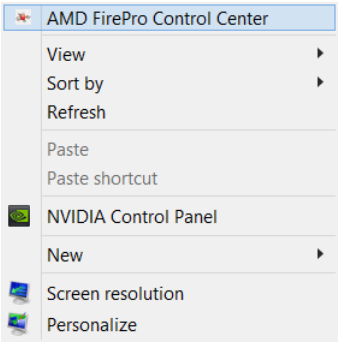


Figure D.1. Select AMD FirePro Control Center

3. Select **AMD FirePro** in the navigation pane, and click **EDID Emulation**.
4. Select any emulated display connection.

   An EDID that is being read from a display cannot be deleted; only emulated EDIDs can be deleted.

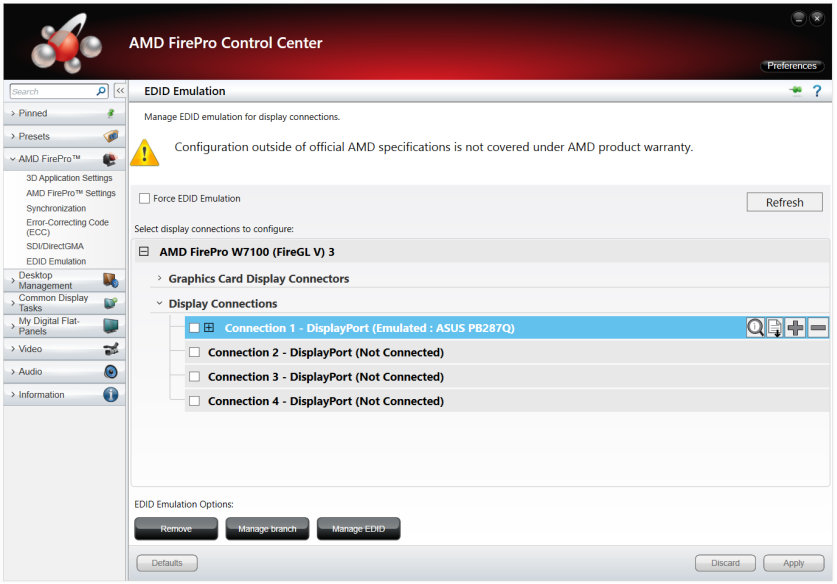


Figure D.2. AMD FirePro™ Control Center display connections

The four icons at the right-hand side of the selected connection allow you to…

a. View the selected EDID in HEX format.
b. Save the selected EDID to a file.
c. Add or modify emulation properties.
d. Remove the selected EDID or branch emulation.

5. Click on the **Minus** icon to remove the selected EDID.

   The text for the selected connection changes from “DisplayPort (Emulated:…)” to “DisplayPort (Connected:…).”

D.2 Removing an emulated EDID through the NVIDIA Control Panel

1. Right-click anywhere on the desktop to summon the desktop menu.
2. Click on **NVIDIA Control Panel**.

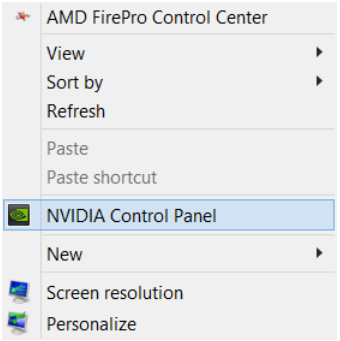


Figure D.3. Select NVIDIA Control Panel

3. Select **Workstation** and **View system topology** from the Select a Task pane of the NVIDIA Control Panel.

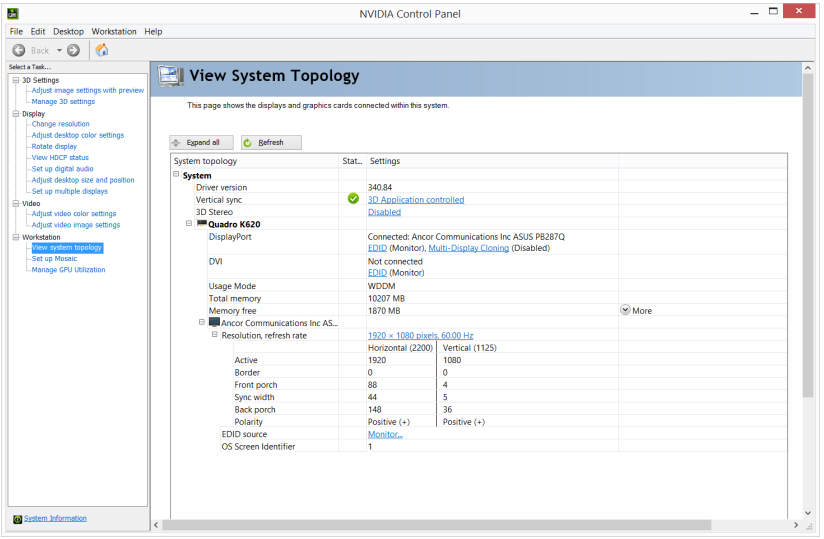


Figure D.4. NVIDIA Control Panel

Figure D.4, "NVIDIA Control Panel" shows that the DVI port of the Quadro K620 is not connected, but the DisplayPort port is connected to an ASUS monitor.

4. Click, under Settings, on the EDID you wish to manage.

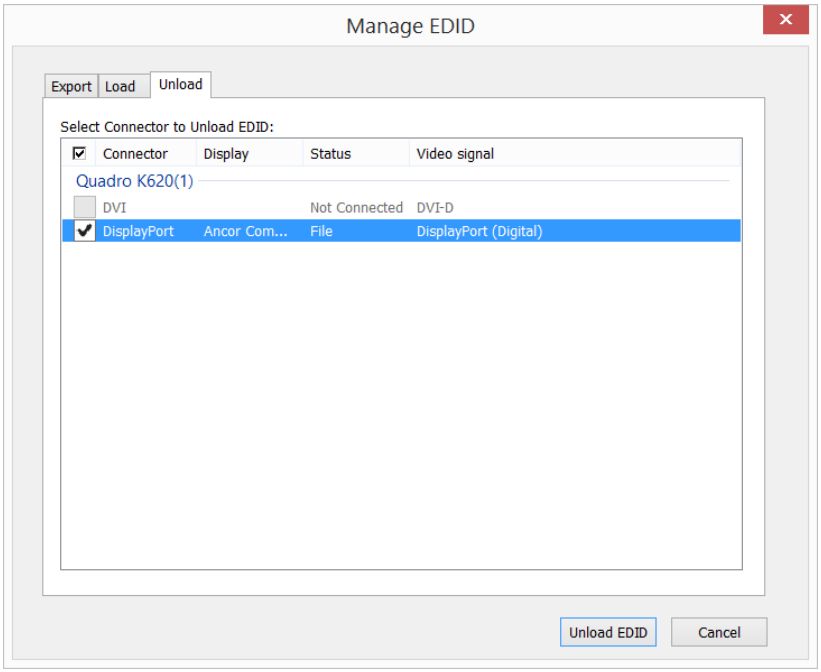


Figure D.5. NVIDIA Manage EDID window

The NVIDIA Manage EDID screen has three tabs.

a. *Export* allows you to create an EDID file based on the current display.
b. *Load* allows you to load an EDID file to use as an emulated EDID.
c. *Unload* allows you to remove an emulated EDID file from a connection.

5. Select the **Unload** tab on the Manage EDID window.
6. Select the emulated EDID that you wish to remove.

   Only emulated EDIDs may be selected and removed. If the connector is reading an EDID from an active display, the connector is grayed out and is not selectable.
7. Click on the **Unload EDID** button.

Appendix E: Input check

The Barco Media Server has two applications that allow you to check whether or not the video capture card is receiving input. The *dREC* application checks the SDI input on the video capture card in the Barco Media Server XHD-404, and the *Vision window* application checks the DVI input on the video capture card in the Barco Media Server XHD-402.

E.1 DVI video input check

Use the *Vision window* application check the DVI input on the Datapath VisionAV-HD video capture card in the Barco Media Server XHD-402.

1. Click the Windows icon at the lower left-hand corner of the screen to access the Windows Apps screen.
2. Select the Vision window icon to open the New Vision Window.
3. Select the input (1 or 2) that you want to check from the Input drop-down list.
4. Click **OK**.

The Vision Window checks the selected input. If the input is present, Vision Window shows the input. (See *Figure E.1, "Vision Window output"*.) If no input is detected, Vision Window displays the message, "No input."

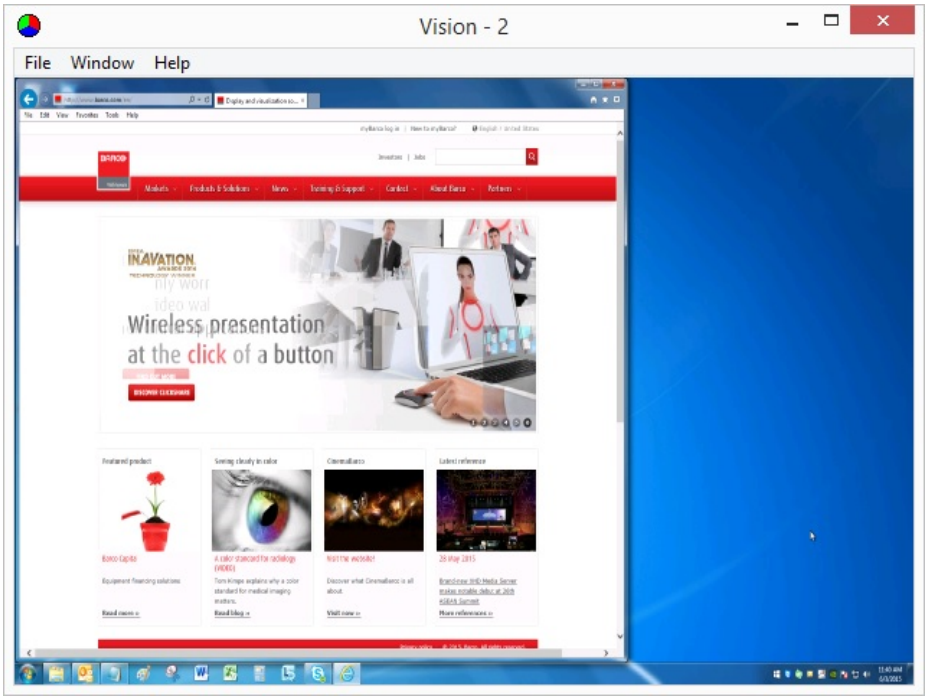


Figure E.1. Vision Window output

E.2 SDI video input check

Use the *dREC* application check the SDI input on the Delta-3G-elp 40-bb video capture card in the Barco Media Server XHD-404.

1. Click the Windows icon at the lower left-hand corner of the screen to access the Windows Apps screen.
2. Select the dREC icon to open dREC.
3. dREC displays the Record module.
    - The Device Control panel displays the video capture card parameters.
        - The Card field identifies the card.
        - The Channel field allows you to select the video input channel (RX0 – RX3).

- The Video Preview panel shows the input, if there is any.

  If there is no input signal, the Video Preview panel displays the message, "NO SIGNAL."

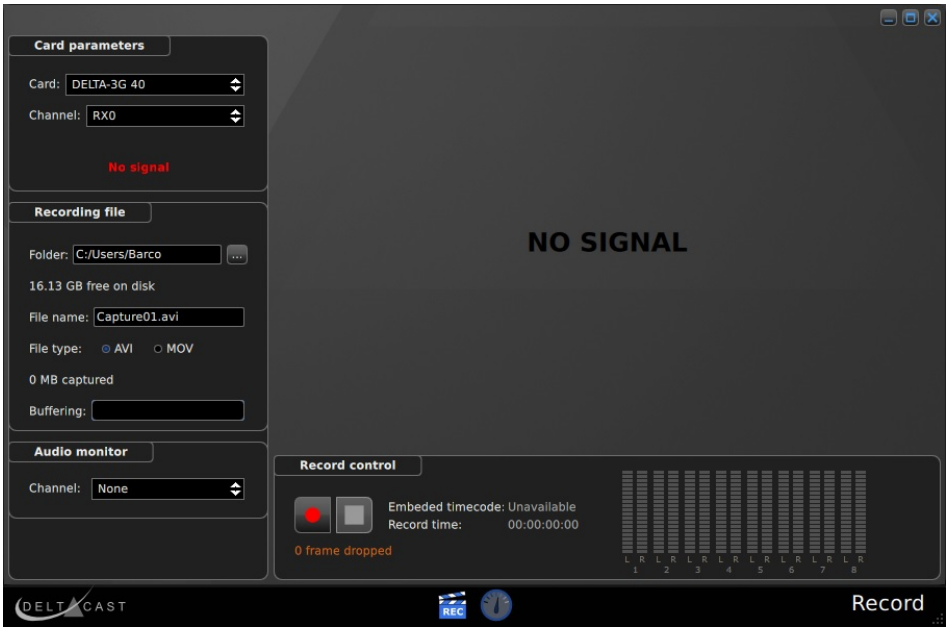


Figure E.2. dREC Record module, showing "NO SIGNAL"

Appendix F: Trouble shooting

Use *Table F.1, "Trouble-shooting matrix"* to trouble-shoot problems with the Barco Media Server.

Caution

When handling power connections, remember to always follow safety procedures.

- Power down the Barco Media Server.

  Switch off the power switch on the front panel *and* the master power switch on the rear panel.
- Disconnect the power cord from the Barco Media Server.
- Remove all cables from the Barco Media Server.
- Make sure that your hands are free of dirt, grease, or foreign substances that may damage the PCIe card or any components that you may touch inside the server.
- Make sure you are "grounded."

  Wear an anti-static wrist strap, also known as a ground bracelet, or make sure that you touch a metal object that is touching the ground to discharge any static electricity you may have accumulated.

Problem	Possible cause	Remedy
Media server does not start	The Master Power switch is not ON.	Make sure that the Master Power switch on the rear panel is ON.
	The power supply is not connected to a valid power source.	Make sure power supply is connected to a valid power source. Check motherboard for any power indication or errors.
	EATX12V connector is loose or disconnected from the motherboard. If EATX12V is not connected, the system may repeatedly start and stop, start and stop.	Make sure that the EATX12V connector is firmly seated. When handling power connections, remember to always follow safety procedures. See *Caution*.
No video output	The DisplayPort-to-DVI adapter may be incorrect.	Be sure to use supplied active and passive adapters in proper order. See the notes to Table 2.1 in the *Box content (p.26)* section of this user guide.
	The video cable may not be properly connected.	Make sure cable is seated correctly and the thumbscrews are tight.
	The display has not been enabled by Windows.	Enable the display in the Windows screen setting.
	The EDID does not match the attached display.	Remove the previously used EDID and verify that you can see the Windows desktop. (See *EDID management (p.81)*.)
Images unstable or showing bad performance	The operating temperature is too high.	Operating ambient temperature must be higher than 0°C (32°F) and lower than 40°C (104°F). Leave sufficient front and rear clearance to ensure that airflow through the chassis is not restricted.
	The content is not properly encoded or has too many layers.	Be sure to encode content with X-Agora Media Encoder. Content is not properly encoded, or it has too many layers.

Problem	Possible cause	Remedy
Bad output on a specific channel	The connections may be incorrect.	Make sure that the cable is seated correctly and that the thumb-screws are tight.
	The suggested cable length has been exceeded.	Be sure not to exceed maximum cable length.
	The converters are unsupported.	Be sure to use the supplied converters. (See Note #2 to *Table 2.1, "Box content"*.) Swap the converter for a converter with a known good output.
Bad input on a specific channel	A connection or cable is bad.	Make sure that the cable is seated correctly and that the thumb-screws are tight. Swap the cable for a known good cable.
	The suggested cable length has been exceeded.	Be sure not to exceed maximum cable length.
	The converters are unsupported.	Be sure to use the supplied converters. (See Note #2 to *Table 2.1, "Box content"*.) Swap the converter for a converter with a known good output.
	The input format is unsupported.	• Be sure to use specified video input formats. See the *Supported 3D, audio, image, and video formats (p.206)* section of this user guide. • To check the DVI inputs, use the Vision window application installed on the server. See the *DVI video input check (p.85)* section of this user guide. • To check the SDI inputs, use the dREC application installed on the server. See the *SDI video input check (p.86)* section of this user guide.

Problem	Possible cause	Remedy
Devices do not communicate through the network.	This is a possible cable or network switch issue.	Check all of the Ethernet cables and verify that they are plugged in. If you are using a network switch, verify that is ON and is operating properly.
	The IP address is incorrect; the IP address is not within your LAN range.	Check to see if the IP address is within your LAN range.
	The IP address is incorrect; there is a conflict between network addresses.	Check if the BMS network address is already in use by another device on the local network.
The dynamic configuration (DHCP) does not work, when connecting a designer laptop to the server.	This configuration does not have a DHCP server.	Disable the DHCP option and enter a static network address compatible with the PC running the Event Master control software (range, subnet mask, etc.).
The unit does not respond to any front panel switches.	The internal cables may be disconnected.	Make sure that the cables from the front-panel switches are plugged in on the motherboard.
The front-panel USB ports do not work.	The USB device may be faulty.	Try a different USB device in the port.
	The internal cable may be disconnected.	Make sure that the cable from the front-panel USB port is firmly seated in the USB3_78 connector on the motherboard.
Cannot read from or write to the USB drive.	The USB drive may be bad or formatted incorrectly.	Make sure that the USB flash drive is formatted to use the FAT32 file system. If you cannot access the USB flash drive from another PC, then you may have a faulty USB flash drive.
Unable to perform a System Restore	Power may have been lost during System Restore.	Restart System Restore.
Data on the D: drive is lost after a System Restore.	A Full System Restore, rather than a System Restore, was performed.	There is no immediate remedy; the data is lost. See the *Restore (p.37)* section of this user guide.

Table F.1. Trouble-shooting matrix

Appendix G: Window menu panes

The X-Agora interface offers several panes for viewing aspects of your project. You can access these panes by using the Window menu on the menu bar at the top of the screen. A checkmark next to an item in the Window drop-down menu indicates that the pane for that item is active.

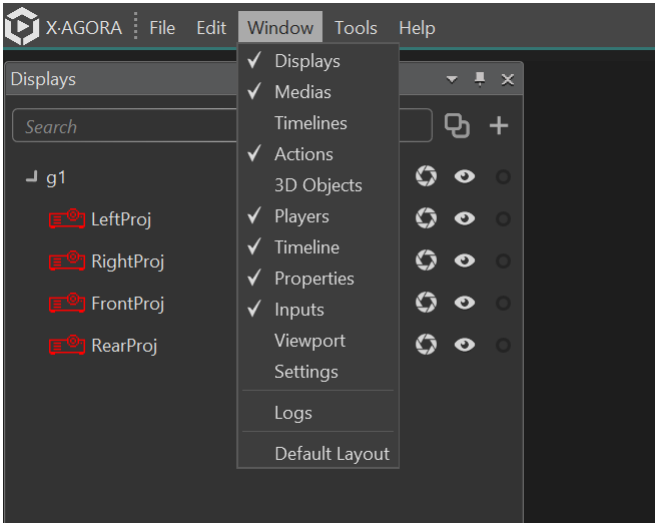


Figure G.1. Window tab

G.1 Displays pane

X-Agora distinguishes between two types of displays.

- Projectors
- Screens: (LCD screens, LED screens, curved LCD screens, and curved LED screens)

The Displays pane allows you to adjust the properties of projectors and screens to the real-world constraints of your project.

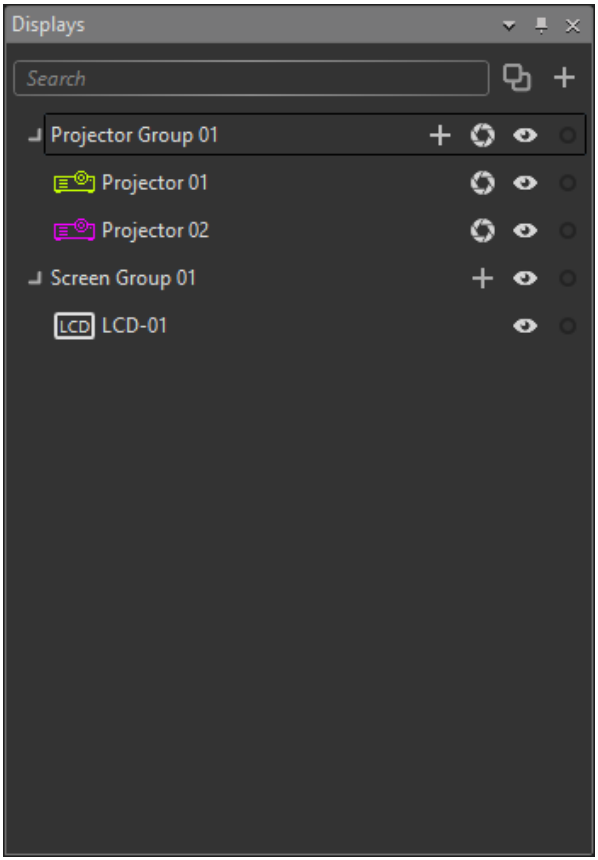


Figure G.2. Displays groups

1. Open the Displays pane and select the projectors or screens the attributes of which you wish to modify. (See *Figure G.2, "Displays groups"*.)

   Selecting a display (either in the Displays pane or in a Viewport) causes the Properties pane to show the parameters of the selected display.

2. Edit the parameters of the display, such as its x, y, and z coordinates, lens shift and throw ratio (for projectors), or resolution.

G.1.1 Display groups

The displays created to simulate real-world projectors and screen setups appear as Projector Groups or Screen Groups in the Displays pane. Groups can be used to organize your displays for ease-of-use.

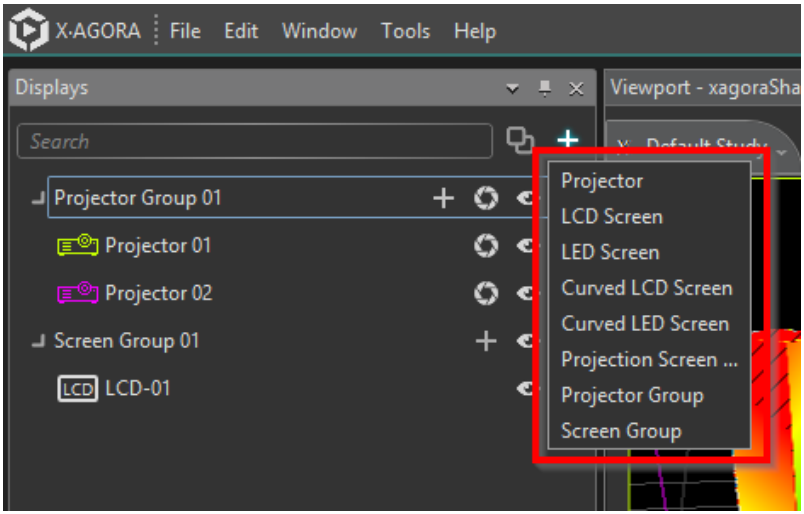


Figure G.3. New group

G.1.2 Add display

To add a display, you can use the menu shown in *Figure G.3, "New group"*. If you want to add a display to an existing display group, use the **+** icon of that group. See *Figure G.4, "Add display to an existing group."*.

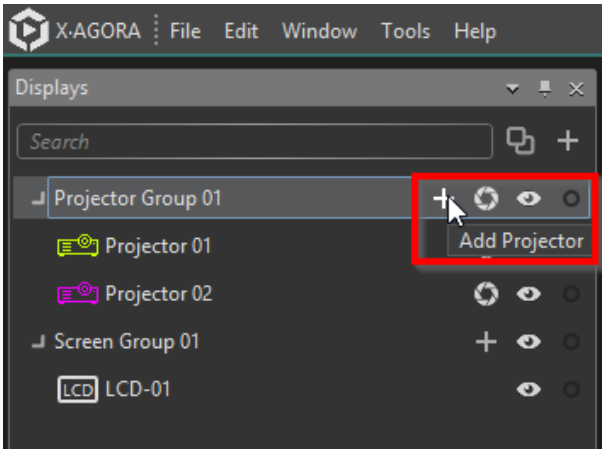


Figure G.4. Add display to an existing group.

G.1.3 Display properties

Selecting a display (either in the Displays pane or in a Viewport) causes the Properties pane to show the properties of the selected display. You can also modify multiple displays, if they belong to the same display group, by selecting that display group.

Projector properties

Figure G.5. Projector properties

The Properties pane of a projector is divided into several sections.

Name:	Name a display. (A display's name should be unique within a project.)
Position:	Modify the position of a projector and its target, as well as its **Roll** and **Orientation** (**Portrait** or **Landscape**) attributes.
Appearance:	Identify a projector by giving it a unique color. View useful measurements of the projector and its target. Hide the cone, if your projection study becomes too crowded.
Settings:	Change the lens shift and throw ratio, or turn the shutter on and off.
Specifications:	Specify the physical dimensions of the projector, and enter information such as its model and lens shift.

Screen properties

The available properties depend on the type of screen selected.

G.1.3.2.1. LCD screen and curved LCD screen properties

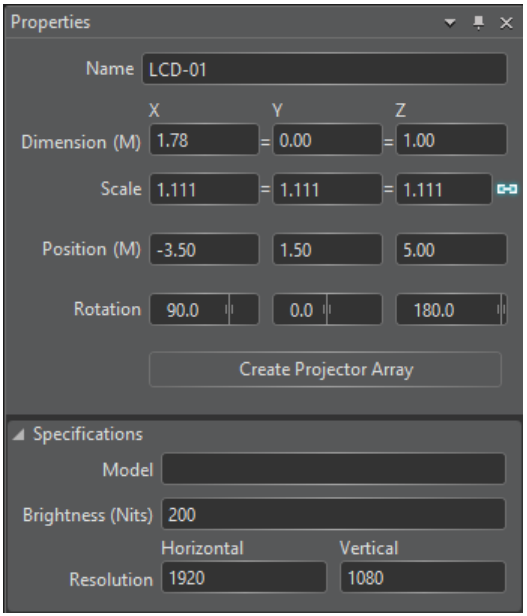


Figure G.6. LCD screen properties

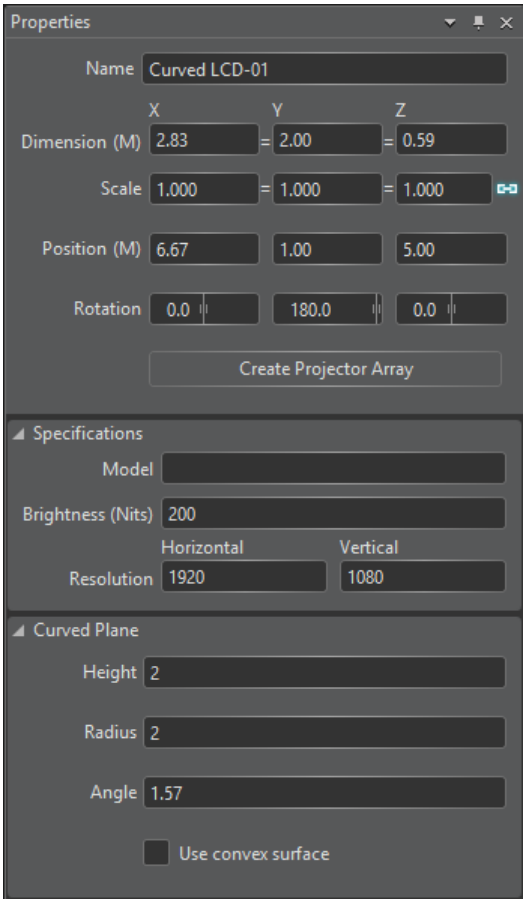


Figure G.7. Curved LCD screen properties

LCD screen and curved LCD screens share the following properties:

- Name
- Dimension (M)
- Scale
- Position (M)
- Rotation
- Specifications
    - Model
    - Brightness (Nits)
    - Resolution

For curved LCD screens you can also define properties related to the curvature of the screen.

G.1.3.2.2. LED screen and curved LED screen properties

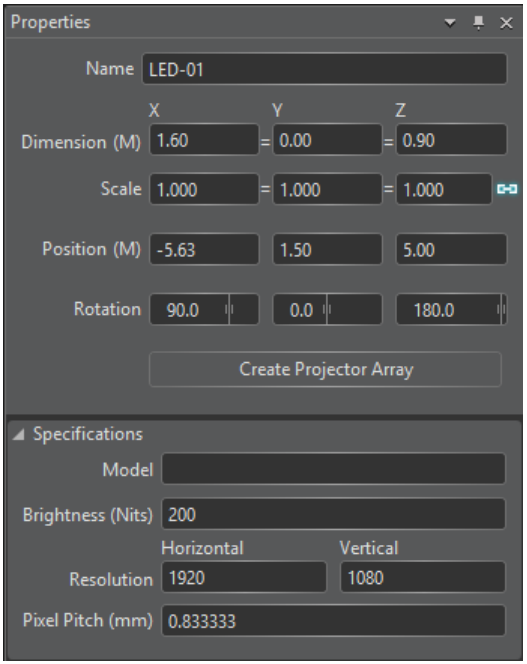


Figure G.8. LED screen properties

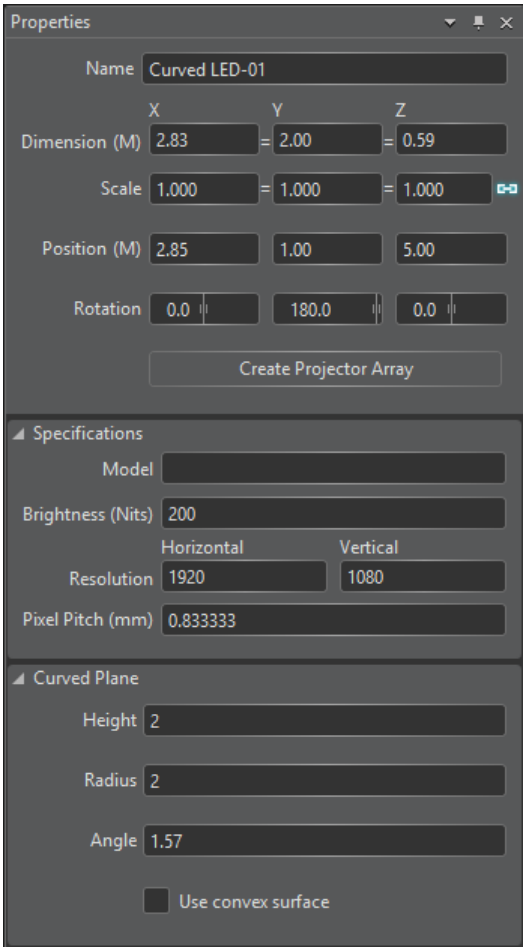


Figure G.9. Curved LED screen properties

LED screen and curved LED screens share the following properties:

- Name
- Dimension (M)
- Scale
- Position (M)
- Rotation
- Specifications
    - Model
    - Brightness (Nits)
    - Resolution

- Pixel Pitch (mm)

For curved LED screens you can also define properties related to the curvature of the screen.

G.2 Media pane

G.2.1 Media type

X-Agora supports various types of video, image, sound and real-time media formats (such as live inputs and dynamic text). See *Supported 3D, audio, image, and video formats (p.206)*. All of the available media files and outside sources are available from the Library pane.

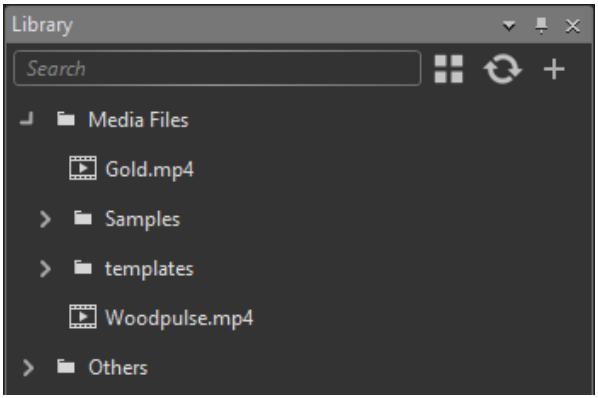


Figure G.10. Media pane

The media controls include a search bar for searching media names, a toggle button to switch between tree view and tile view, a refresh button to manually scan the medias folder, and a + button to import external media.

Figure G.11. Media controls

G.2.2 Tree view and tile view

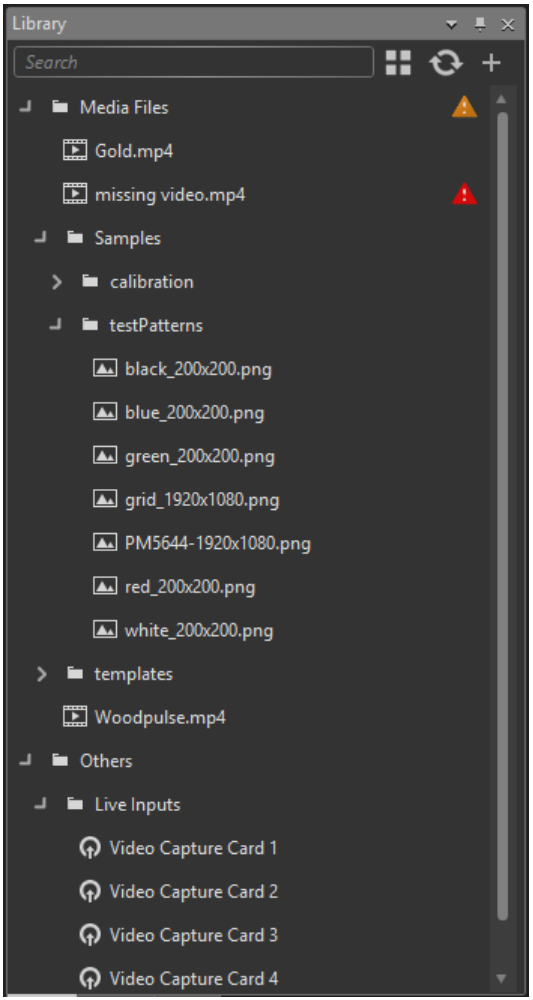


Figure G.12. Tree view

The tree view shows the media as a tree, as would a common file explorer. This view is convenient for having a global overview of all available media.

Switch to the tile view to view media thumbnails. Tile view offers a view of individual folders, which can be browsed on a per-folder basis.

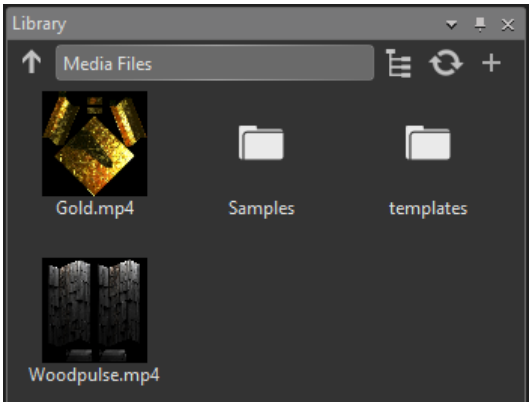


Figure G.13. Tile view

Both views show missing media—and folders with missing media—using warning icons.

G.2.3 Importing, managing, and refreshing media

To add media files, simply drag and drop media files from Windows Explorer onto a Timeline or onto the Media Tab itself. This copies them to the project's medias folder and makes them available for later use.

If you've added new medias manually to your project since last opening the project, click on the Refresh icon, and X-Agora will scan the contents of the medias folder.

All media files that X-Agora sees are added to your project. If the actual file corresponding to a media file disappears, the media file in X-Agora is identified as missing, but it remains in the media views. To delete an existing or missing media file, right-click that file in the Medias pane and choose to delete it. (Alternatively, you can choose to open the file's location in Windows Explorer from that same contextual menu.) To link a missing media file to its physical location, right-click the missing media file and choose **Locate media** to open a dialog that allows you to link the X-Agora media to its actual file.

G.2.4 Previewing media

Click on a media file to preview it, and a preview appears in the Properties pane.

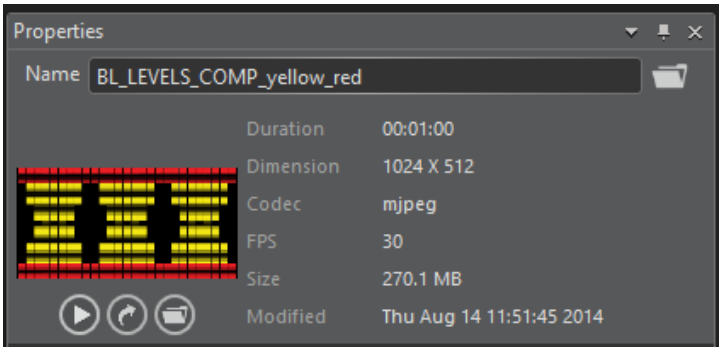


Figure G.14. Media preview

G.3 Timelines pane

The Timelines pane contains all the Timelines and Timeline Groups in a given scene.

Note

Do not confuse the *Timelines* pane with the *Timeline* pane, in which you assemble media assets to compose a show or multimedia installation.

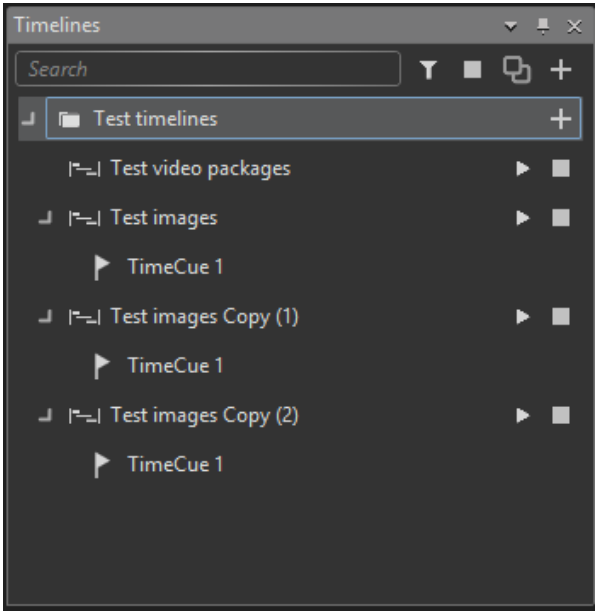


Figure G.15. Timelines pane

All Timelines are part of a Timeline Group. Each X-Agora project is created with at least one Timeline Group by default.

To open a Timeline: Expand the **Group** by clicking the arrow next to it in the Timelines tab in the bottom left-hand corner, and double-click a Timeline.

To create a new Timeline Group: Click the **+** symbol in the top right corner of the Timelines pane.

To create a new Timeline *within* a Timeline Group: Click the **+** symbol directly to the right of the Timeline Group.

The top bar in the Timelines tab allows you to show currently playing Timelines, to stop all Timelines, or to search for a specific Timeline. To duplicate a Timeline, click on it, then click the **Duplicate Timeline** icon at the top of the pane.

Expanding a Timeline (clicking the arrow to the left of the Timeline) causes a list of TimeCues for that Timeline to appear. Clicking once on a TimeCue takes you to that TimeCue in the Timeline pane. Double-clicking on a TimeCue starts playing that Timeline from the TimeCue.

G.4 Actions pane

Actions give you real-time tools to go beyond basic video and sound playback. They make it possible to add real-time visual effects to your Timelines, control external systems such as Art-Net lighting fixtures, and move 3D objects in the scene.

G.4.1 Lighting

Action	Description
Art-Net	Transmits Art-Net values to a specific IP, Port, DMX universe and channel(s).

Table G.1. Lighting

G.4.2 Particles

Particle system actions are presets with adjustable parameters.

G.4.3 Post-Processing

Post-processing actions are applied on the 2D image rendered in the Viewport (as opposed to individual objects or media assets).

Action	Description
Ambient Occlusion	Applies ambient occlusion on the image.
Color Correction	Modifies saturation, min and max (black and white) levels, gamma, hue offset, and brightness.
Fade In	Fades in from plain black to the scene.
Fade Out	Fades out from the scene to black.
Manual Fade	Allows for manual fade control of the scene.
Reveal	Defines a revealer object that, when in front of a defined revealed object, reveals it.
Video Filter Led Simulator Glass Ripples	Provides standard shader-based video effects.

Table G.2. Post-Processing

G.4.4 Sound

Action	Description
Play sound from folder on event	Plays a specific sound on an event.
Play sound on event	Plays a specific sound on an event.
Submix sound	Mixes a sound from different channels.

Table G.3. Sound

G.4.5 Timeline

Action	Description
Go to Cue	Sends the playhead to the specified TimeCue. The TimeCue can be either inside the same Timeline or in a seperate Timeline.
Pause Timeline	Pauses the playhead. All free-running assets continue playing.
Play Timeline	Plays a specific Timeline group.
Preload Timeline	Preloads all media assets to avoid lag when starting a Timeline.
Seek time	Sends the playhead to the specified time (in the same Timeline).
Start Timeline on event	Starts a specific Timeline upon an event trigger.
Stop Timeline	Stops the Timeline on which the Action is placed.
Stop Timeline by name	Selects the name of the Timeline to be stopped from the drop-down list in this Action's properties.
Stop Timeline on event	Stops a specific Timeline upon an event trigger.

Table G.4. Timeline

G.4.6 Transformations

Action	Description
Move node	Moves an object in the 3D space over time.
Position node on plane	Positions a node on a plane, according to normalized x and y coordinates.
Rotate node	Rotates a node in three dimensions, given a rotation axis and an angle.
Scale node	Scales an Object in 3D Space over time.
UV adjust	Adjusts the UV of an object.
UV crop	Adjust UVs to apply a media on part of an object, or vice-versa.

Table G.5. Transformations

G.4.7 Visibility

Action	Description
Hide object	Hides a specified 3D object from the 3D scene for the duration of the action.
Show object	Shows a specified 3D object from the 3D scene for the duration of the action.

Table G.6. Visibility

G.5 3D objects pane

The 3D Objects pane provides a list of all the 3D objects in your scene. It also allows you to select them individually in order to highlight them in the *Viewport* and expose their parameters in the *Properties pane*. You can use the Properties pane to resize and reposition 3D objects. See *3D objects pane (p.157)*.

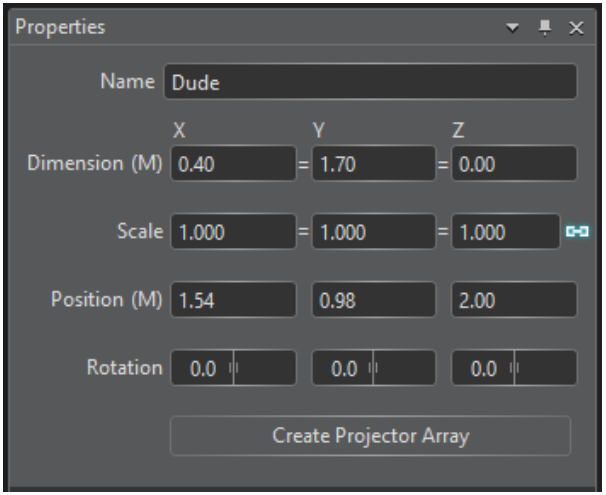


Figure G.16. 3D Object Properties pane

G.6 Timeline pane

The Timeline is where you compose the show or multimedia installation by assembling media assets in time. Create as many Timelines as you want, and add video, image, sound, or real-time graphics in layers. The Timeline pane displays the layered content of one Timeline.

Note

Do not confuse the *Timeline* pane with the *Timelines* pane, which contains all the Timelines and Timeline Groups in a given scene.

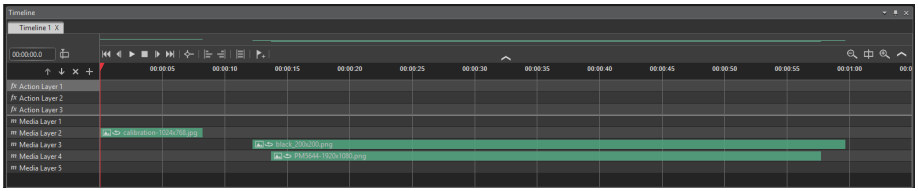


Figure G.17. Timeline layers

G.6.1 Timeline playback and element-manipulation controls

Figure G.18. Timeline playback and element-manipulation controls

From left-to-right the Timeline playback and element-manipulation controls are:

Go to Start: Moves the Playhead to the start of the Timeline.

Last Frame: Moves the Playhead to the last (previous) frame.

Play/Pause: Plays or pauses the Timeline.

Stop: Stops the Timeline.

Next Frame: Moves the Playhead to the next frame.

Go to End: Moves the Playhead to the end of the Timeline.

Snapping On/Off: Turns Snapping mode On or Off.

When in Snapping mode, elements on the Timeline can snap to other elements. When dragging an element, a visual marker indicates if snapping is possible. If snapping is possible, releasing the element snaps it to the visual marker.

Align Left: Aligns two or more elements to the leftmost element.

Select the elements to be aligned and click this button to align them.

Align Right: Aligns two or more elements to the rightmost element.

Select the elements to be aligned and click this button to align them.

Same Width: Sets the length of two or more elements to that of the longest selected element.

Select two or more elements and click on this button to set the length of all selected elements to that of the longest element.

Add TimeCue: Adds a TimeCue at the position of the Playhead.

G.6.2 Zooming

Figure G.19. Zooming controls

From left-to-right the Timeline zooming controls are:

Zoom out: Zooms out on the Timeline.

You can also zoom out by using the mouse scroll button.

Keep Center while Zooming: Keeps the center of the Timeline fixed while zooming.

By default, zooming is fixed on the left of the Timeline. This button overrides the default.

Zoom in: Zooms in on the Timeline.

You can also zoom in by using the mouse scroll button.

Hide Minimap: Hides the minimap, which is above the controls.

G.6.3 TimeCue

A TimeCue is a time marker that belongs to a specific Timeline. A Timeline can be started at a given TimeCue from external Timelines or events using the Go-to-Cue Timeline action. You can add a TimeCue using the Add TimeCue icon or by right-clicking on the time strip.

G.6.4 Keyframing

A Keyframe is a property value of a Timeline element, mapped to a specific time on the Timeline. Keyframing allows the smooth transition from one value to another. For more information on Keyframing, see *Keyframing (p.146)*.

G.6.5 SMPTE configuration

1. Select the Master Player, which should be the Player with a bold colored outline, from the Output control.

2. Choose the correct input device in the Audio devices section of the Player's Properties pane.

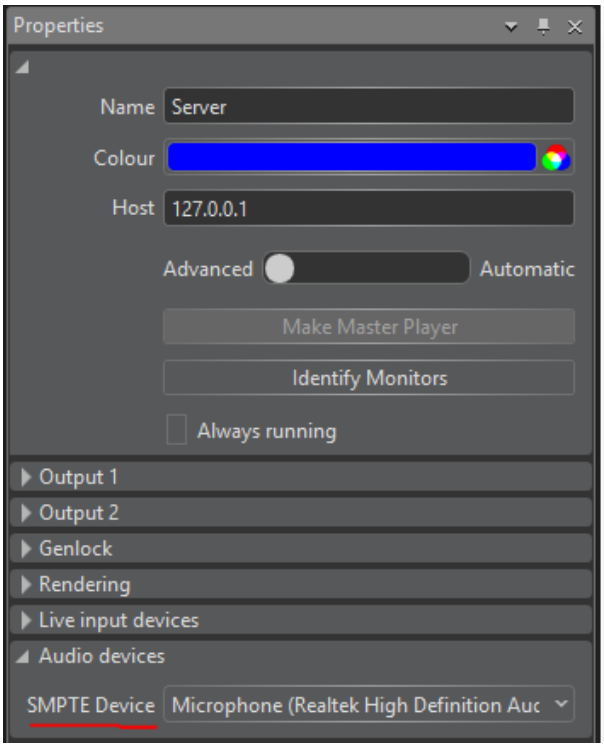


Figure G.20. SMPTE device configuration

3. Configure the Master Player.
4. Launch the Master Player.

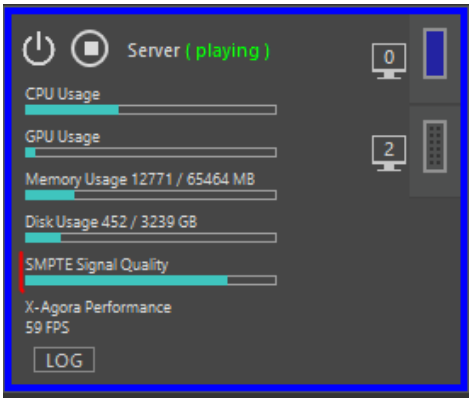


Figure G.21. SMPTE signal strength gauge

In the Output's layout you should see the SMPTE signal strength gauge moving. If you don't see anything, it means that either the signal is too dim or the chosen audio device has to be changed.

Note

You must launch the Master Player to see any effect. If the Master Player is not running, the Timeline does not react to the SMPTE signal. Running only the designer does not cause the signal quality gauge to react to the SMPTE signal, even if the Master Player is set to run on the same machine.

G.7 Properties pane

The Properties pane gives access to all user-editable elements. To access the properties of any user-interface element, click on the element to open its Properties pane.

G.7.1 Video and image properties

The video and image media types share most of the same properties.

Properties

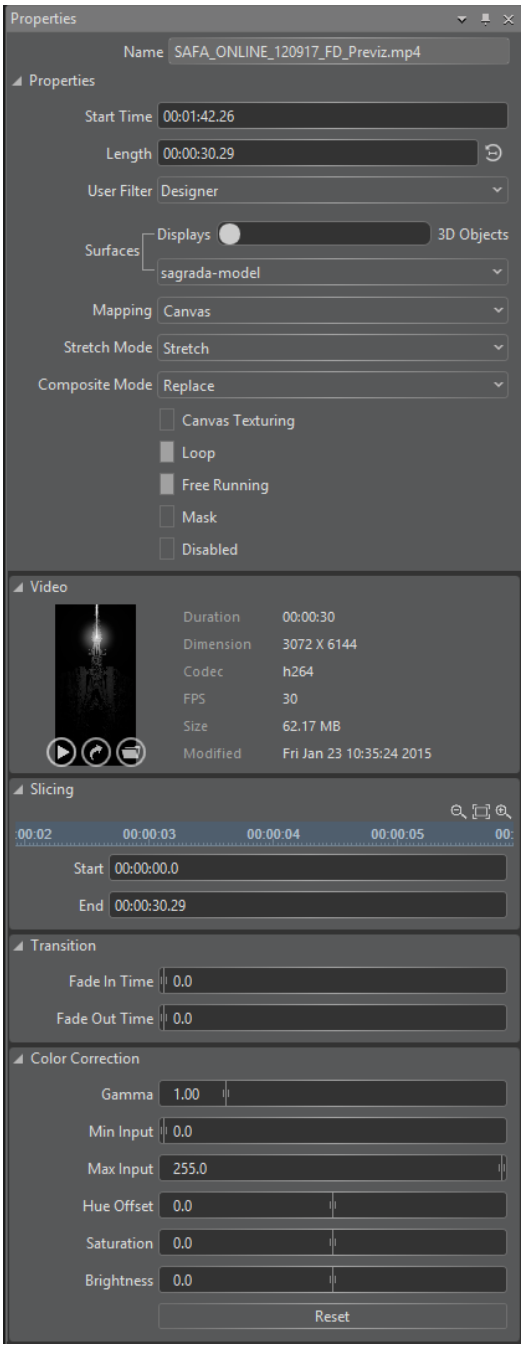


Figure G.22. Video properties for a Timeline element

Video properties

Name:	Displays the name of the corresponding media.
Start Time:	Shows the time at which the element starts playing on the Timeline.
Length:	Shows the duration of the element.
Surfaces:	Allows selection of either Displays or 3D Objects and then selection of the surface on which the element is to appear.
Only play on:	Allows selection of the player on which to play the element, if the media is to appear on only one Player.
Mapping:	Allows choice of UV perspective of the media.
Stretch Mode:	Allows choice between Best Fill, Fill Height, Fill Width, and Stretch modes.
Composite Mode:	Allows choice between Add, Multiply, Replace, and Screen modes to choose the behavior of the media when several media elements appear on the same surface at a given time.
Canvas Texturing:	Associates displays automatically with the correct crops, when you add a package to the Timeline.
Loop:	Loops the media.
Free running:	Allows media to play when the Playhead is paused inside the element.
Mask:	Uses the element as an alpha mask. (Typically used to hide parts of another media element playing at the same time.)
Disabled:	Disables the element.

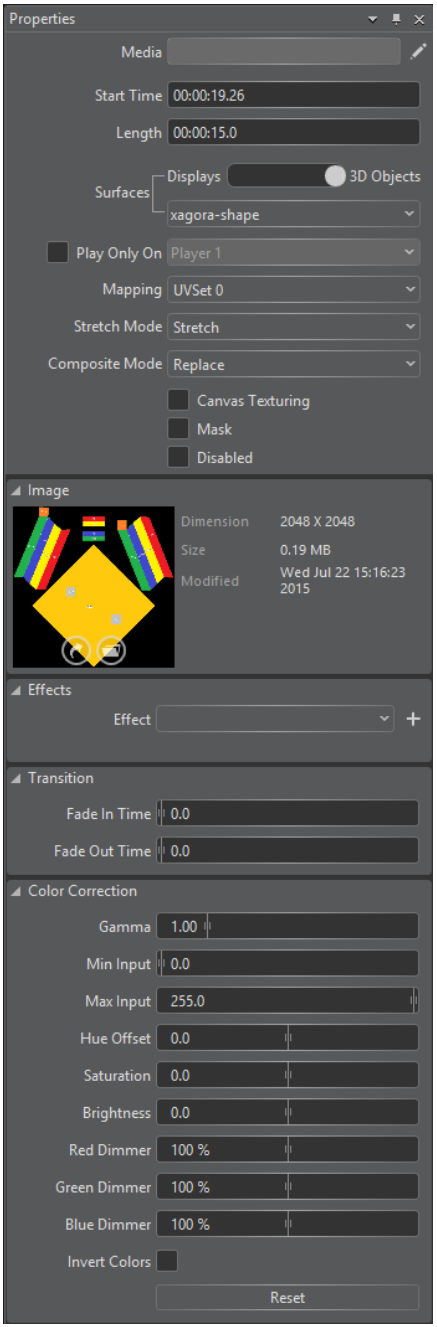


Figure G.23. Image properties

Image properties

Media:	Displays the name of the corresponding media.
Start Time:	Shows the time at which the element starts playing on the Timeline.
Length:	Shows the duration of the element.
Surfaces:	Allows selection of either Displays or 3D Objects and then selection of the surface on which the element is to appear.
Only play on:	Allows selection of the player on which to play the element, if the media is to appear on only one Player.
Mapping:	Allows choice of UV perspective of the media.
Stretch Mode:	Allows choice between Best Fill, Fill Height, Fill Width, and Stretch modes.
Composite Mode:	Allows choice between Add, Multiply, Replace, and Screen modes to choose the behavior of the media when several media elements appear on the same surface at a given time.
Canvas Texturing:	Associates displays automatically with the correct crops, when you add a package to the Timeline.
Loop:	Loops the media.
Free running:	Allows media to play when the Playhead is paused inside the element.
Mask:	Uses the element as an alpha mask. (Typically used to hide parts of another media element playing at the same time.)
Disabled:	Disables the element.

When the surface is a display, media can be moved in the display, as it can be moved in 2D mode, by using its camera menu to switch the Viewport's view to the screen. See *2D media manipulation (p.134)*.

Video

The Video subpane provides a preview of—as well as detailed information about—a video file. You can also open the file in the default operating system application or open the containing folder using the corresponding icons.

Effects

This section allows control of a pipeline of shader effects for this media file. These effects include Blur, RGB offsets, and a way to flip the contents. The effects are processed in the order in which they are added. The effect parameters can be animated using Key-frames.

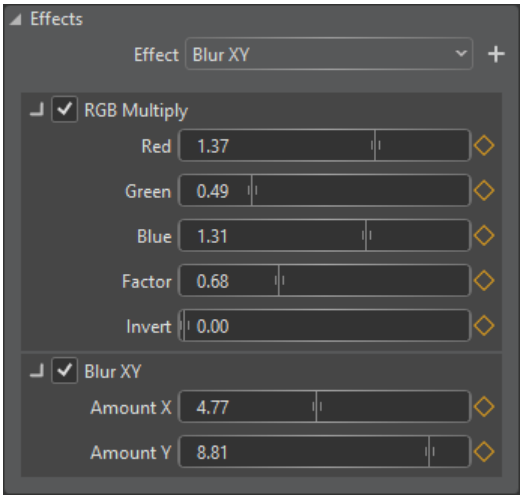


Figure G.24. Media effects

Slicing

The Slicing subpane allows the user to play only a certain part of the video by selecting the start and end time. The use can either enter those times in the Start and End fields, or use the ruler.

Transition

Fade In Time: duration of fade-in

Fade Out Time: duration of fade-out

Color Correction

The industry-standard parameters for color correction are:

Gamma: the gamma correction factor

Min Input: the minimum input value (black)

Max Input: the maximum input value (white)

Hue Offset: the hue offset, represented as an angle between –180 and 180 on a hue wheel

Saturation: the saturation boost factor, between –100% and +100%

Brightness: the brightness boost factor, between –100% and +100%

The **Reset** button resets the color correction properties to their default values.

The properties for an image are the same as the properties for a video, except there are no *Slicing*, *Loop*, or *Free* running options.

Input properties

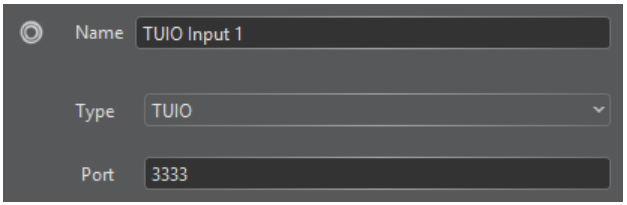


Figure G.25. Properties pane for an input

Name: Enter the name of the input.

Type: Select between TUIO and OSC.

Port: Enter the port to listen to.

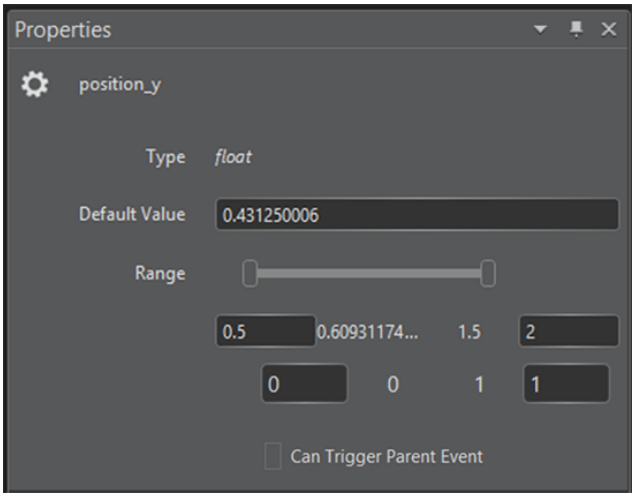


Figure G.26. Properties pane for an input variable

Type: The type of variable can be *float*, *int*, or *bool*.

Default Value: The default value of the variable.

Range: Enter the values received in the text boxes and select to what they are remapped with the slider.

Can Trigger Parent Event: Select or deselect to determine whether or not the value change can trigger the parent event.

Timeline properties

You can show the properties of a Timeline either by clicking on the Timeline tab in the Timeline pane, or by selecting the Timeline in the Timelines pane.

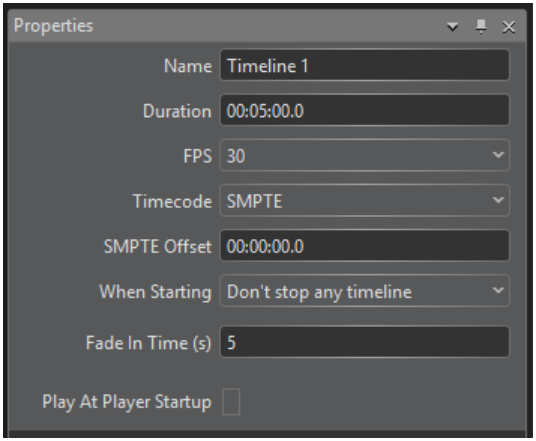


Figure G.27. Timeline properties

Name: Displays the name of a Timeline.

The Timeline can be renamed, and any action parameter using this timeline (for example, the Play Timeline action) is also updated.

Duration: Displays the duration of a Timeline.

Extend the duration of a Timeline, in case you need to fit more media inside it. The default value is five minutes.

FPS: Displays the number of frames per second for the Timeline.

Note that changing FPS may affect the positioning of existing elements inside the Timeline. It is recommended you set the FPS before populating the Timeline.

Timecode: Displays the Timecode.

Choose Internal to use an internal clock to synchronize all the players. Choose SMPTE to control the Timeline by using an SMPTE signal. See *SMPTE configuration (p.110)* for more details.

SMPTE Offset: Displays the SMPTE offset.

This property applies a positive or negative offset to the received SMPTE Timecode. If the SMPTE offset

causes a Timecode to go negative or to go outside the Timeline length, the offset is ignored.

When Starting: This property can help manage Timeline transitions with interactive inputs.

This property ensures that whenever this Timeline is started, other Timelines may continue or be stopped. The options for this property are …

1. Don't stop any timeline.
2. Stop all other timelines.
3. Stop timelines within Group.

Fade In Time(s): This property specifies the time after which other Timelines are stopped, if this option is set.

This property is typically used to give additional time for a new Timeline to play on top of currently playing content, so that the other Timelines may stop without causing a gap in Timeline content.

Play At Player Startup: This property ensures that the timeline is automatically started when launching the players.

G.8 Inputs pane

The Inputs pane allows you to create open sound control (OSC) and tangible user interface object (TUIO) inputs that can then be used to control real-time media elements in your project.

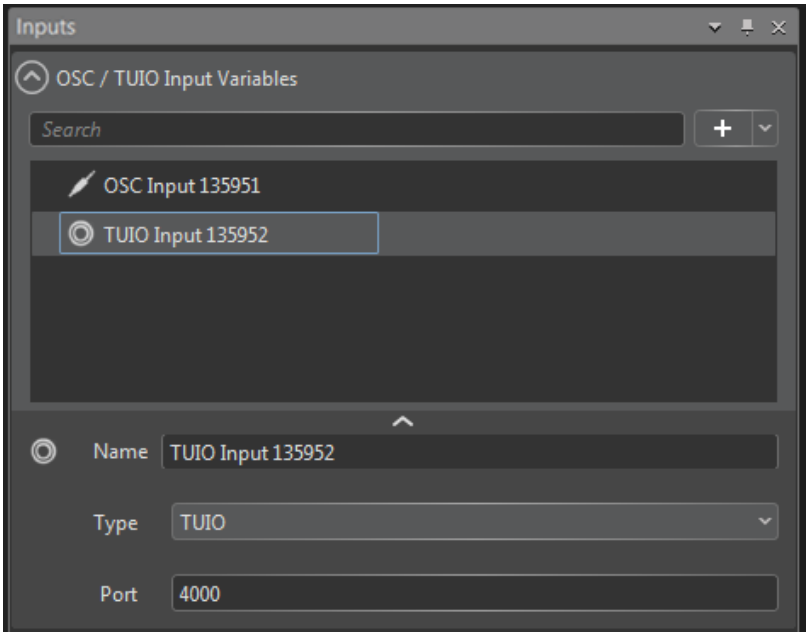


Figure G.28. Inputs pane

G.8.1 Input variables

Once an input is created and receives input through the specified port, real-time feedback concerning the input's contents is displayed. Each TUIO or OSC input displays a list of incoming variables, each of which can be dragged and dropped onto action parameters.

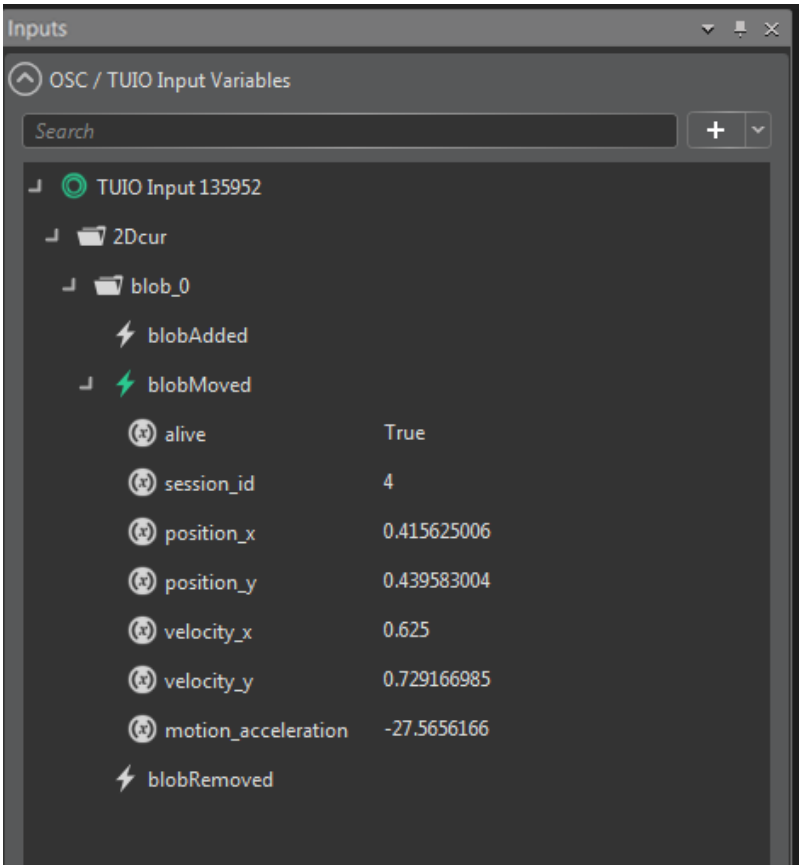


Figure G.29. Input variables

Configuring OSC and TUIO inputs

G.8.1.1.1. Configuring TUIO

To configure TUIO, select the input from the list and the properties will appear in the properties pane on the right. You can set the Name, Type and Port of the input. If the TUIO input is feeding data on the selected port, information will appear automatically under the input in the list.

G.8.1.1.2. Configuring OSC

To configure OSC, select the input from the list and the properties will appear in the properties pane on the right. You can set the Name, Type and Port of the input. If the OSC input is feeding data on the selected port, information will appear automatically under the input in the list.

G.8.1.1.3. Input properties

See *Input properties (p.118)* for examples of the Properties pane for inputs and input variables.

G.8.2 Connecting variables to actions

Input variables can be assigned to almost any action parameter in order to modify it in real time. Simply drag and drop the input variable into the action parameter field to bind them.

Figure G.30, "Moving a "blob" using its x and y positions" shows an example using the x and y positions of a detected moving object ("a blob") to move a 3D object in X-Agora's 3D environment (using the moveNode behavior).

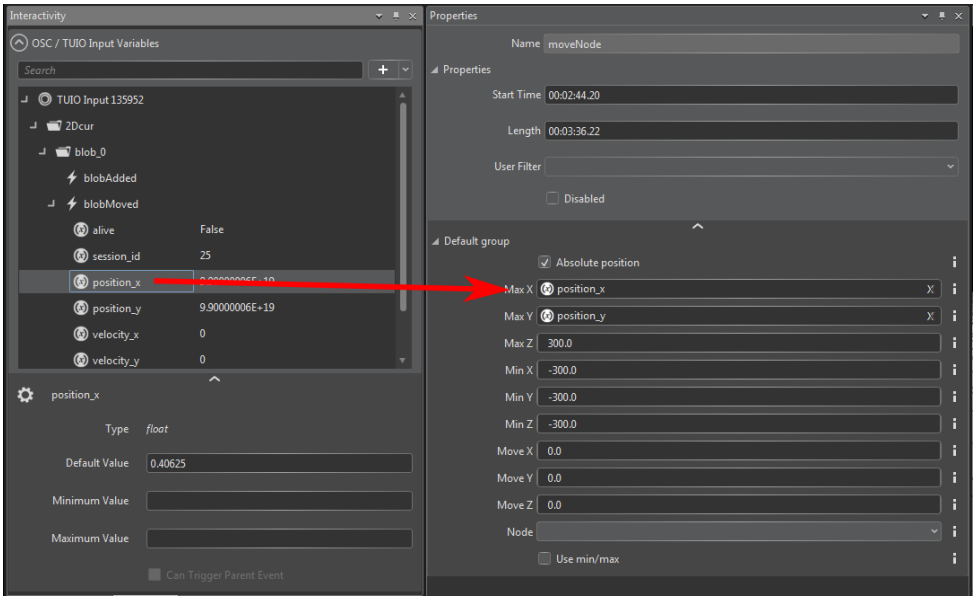


Figure G.30. Moving a "blob" using its x and y positions

Here is another example in which a new blob that will be a trigger to play a Timeline (using the startTimelineOnEvent behavior) is detected.

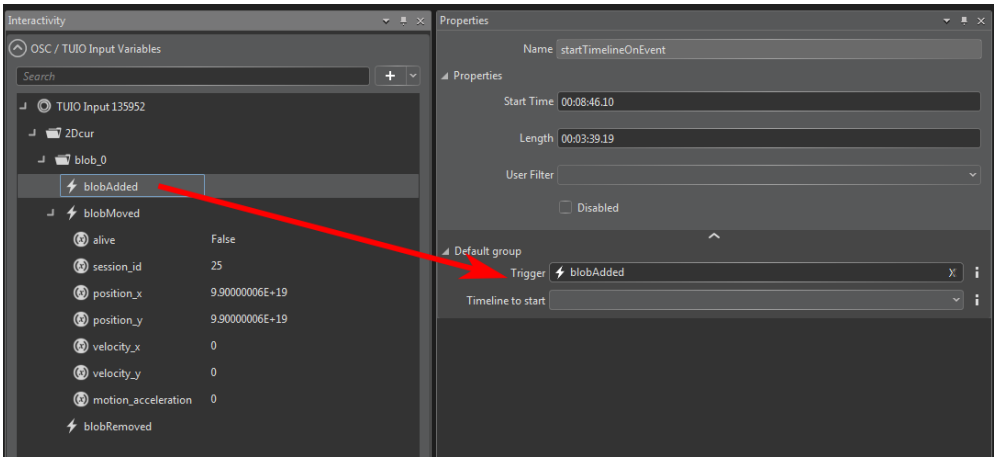


Figure G.31. Detecting a "blob" that will trigger a Timeline

G.9 Viewport

The Viewport pane provides up to four distinct views of the 3D scene in order to facilitate viewing and moving 3D objects and displays.

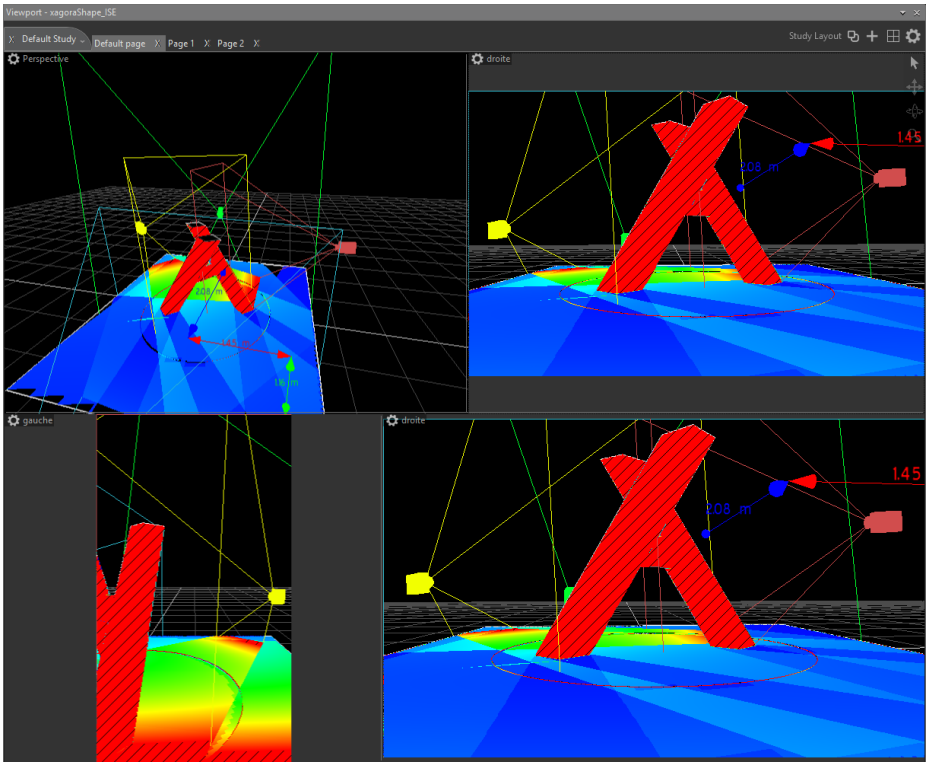


Figure G.32. Viewport

G.9.1 Changing the number and layout of views

Click on the Views Template button, in the top right-hand corner of the Viewport pane, to change the number and layout of views.

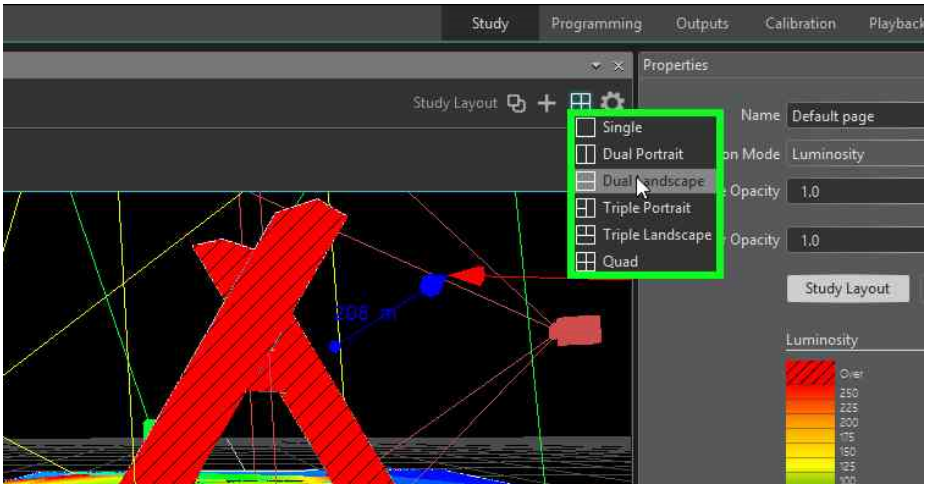


Figure G.33. Views template

G.9.2 Camera and controls

To change the Camera assigned to a Viewport, click the Camera name to the right of the icon in the top left-hand corner of a Viewport frame. The projectors and screens listed in the Displays pane, as well as default cameras such as Top, Front, Left, Right, Bottom, Perspective, and Orthographic, are available here.

To move the camera in the Viewport, a toolbar provides different movement modes: Selection, Pan, Orbit, and Zoom. When using the tool explicitly, the left mouse button behaves according to the selected tool.

To move or scale selected objects in the scene, use the 3D manipulator with axes. Dragging an axis moves or scales the selected objects along that axis. Right clicking in the Viewport while an object is selected opens a menu that allows you to change between the move and scale manipulators. When using the move manipulator, **Shift**+**O** toggles between local and world axes. All the scale, dimension, and rotation properties of an object can be edited in the Properties pane.

All camera controls and object controls can be triggered by using keyboard shortcuts, as described in *Viewport keyboard and mouse shortcuts (p.205)*.

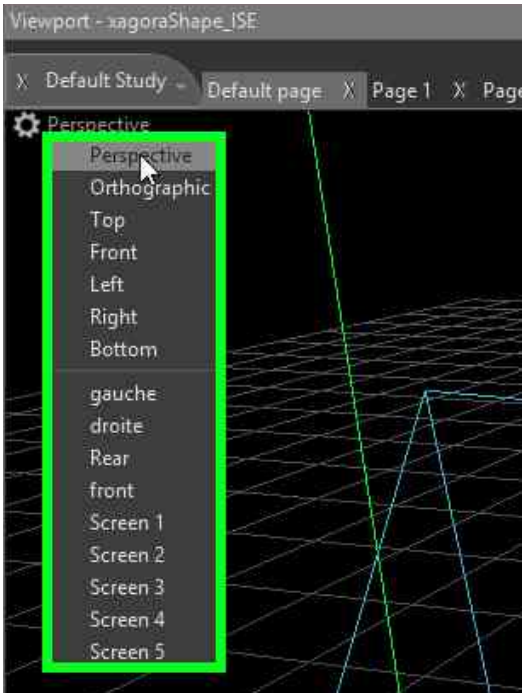


Figure G.34. List of cameras

G.10 Settings pane

The Projection study section of the Settings menu provides access to key features of the Projection Study Tool.

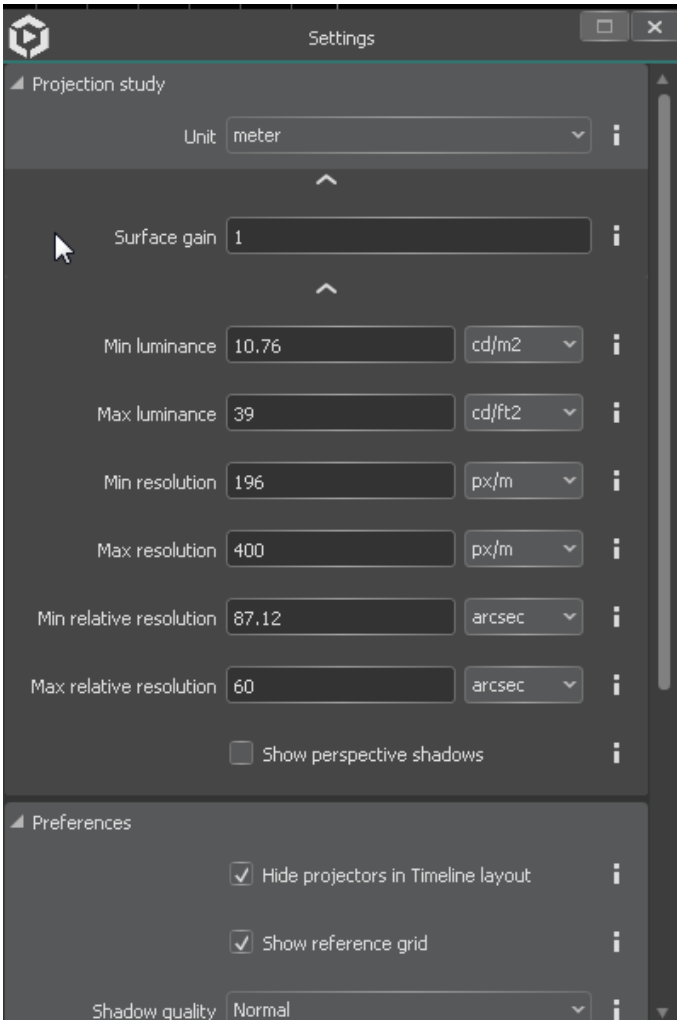


Figure G.35. Settings pane

Unit: Choose between metric and imperial units of measure.

Surface gain: Set a value between 0.0 (100% absorption) and 1.0 (100% diffusion).

Some special surfaces can also have a gain greater than 1.0. Surface gain indicates how much the surface on which you are projecting diffuses back the light.

The following settings define the mapping of a range of values to the color gradient.

Min luminance: Set the minimum acceptable luminance level.

Max luminance: Set the maximum desired luminance level.

Min resolution: Set the minimum acceptable resolution.

Max resolution: Set the maximum desired resolution.

The Preferences section of the Settings pane allows you to toggle ON or OFF the projectors in a Timeline layout and the reference grid.

Appendix H: Tools

This appendix contains information on several X-Agora tools.

H.1 2D mode

Use the 2D mode to create projects that do not need to include 3D elements.

The 2D mode uses a simplified workflow, removes some of the more complex concepts from the 3D mode, and is optimized for 2D performance. Overall, the 2D mode is still very similar to the 3D mode, and most of the information that can be found in these appendices, while written for the 3D mode, is also accurate for the 2D mode.

Select the **2D checkbox** in the **New Project dialog** to create a new 2D project. See *Figure H.1, "Create new 2d project"*.

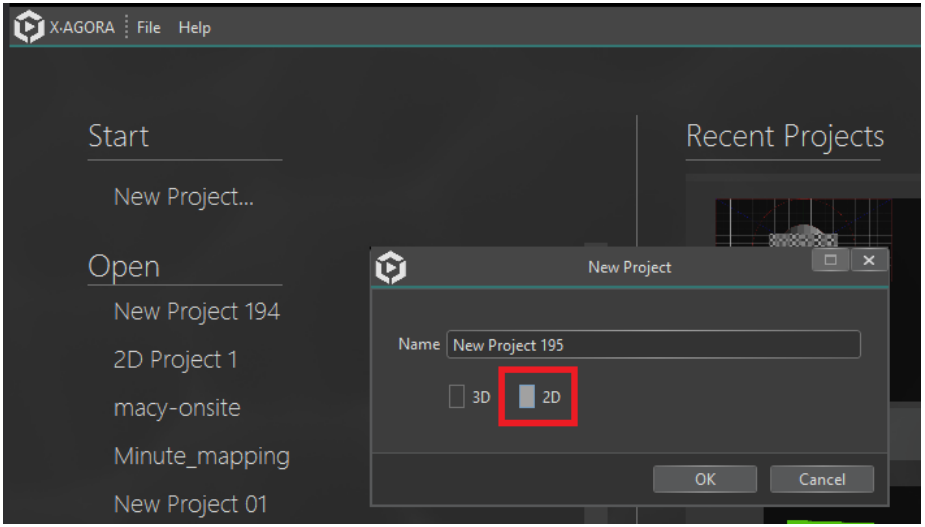


Figure H.1. Create new 2d project

H.1.1 Workflow

The workflow in 2D mode is very similar to the workflow in a 3D project. Most of the 3D layouts are still present and fill the same purposes. The main differences are that there is no projection study layout, and that the viewport displays a 2D scene instead of a 3D environment, where all units are in pixels. The concept of screens and projectors is also abstracted as displays, and a stage is used to define the 2D space in which your show is built.

1. Create a new 2D project.

2. Define the stage dimensions based on what is needed for the project.
3. Create displays and position them in the stage.
4. Add timelines and media as in 3D mode. *2D media manipulation* and *Keyframing* can be used if needed.
5. Proceed with calibration, output control, and playback as in 3D mode.

H.1.2 2D concepts

Stage

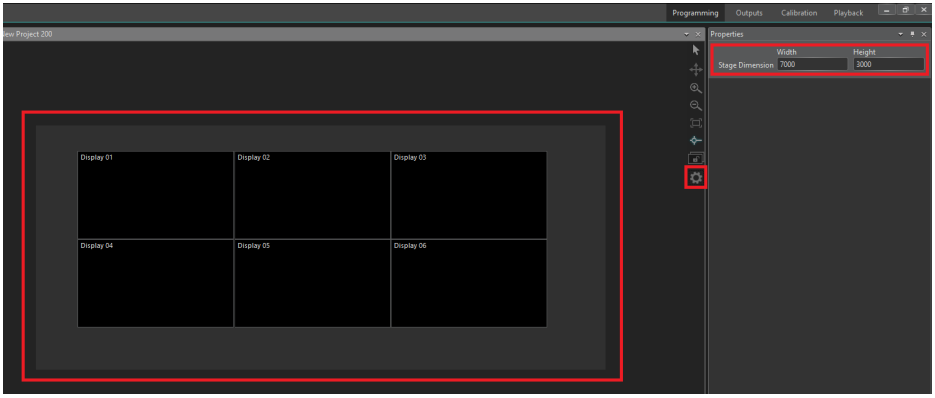


Figure H.2. Stage

The stage is a 2D workspace in which your project is built. The stage is a visual reference, giving you a way to build boundaries within which to work. No restrictions force you to place displays and elements within the stage, but it is strongly suggested that you do so for convenience. The stage is defined by its width and its height in pixels. You may access these properties by using the gear icon in the Viewport's toolbar.

Note

The size in pixels of the stage itself has no effect on performance whatsoever. A stage can be defined to be as large as is necessary.

Displays

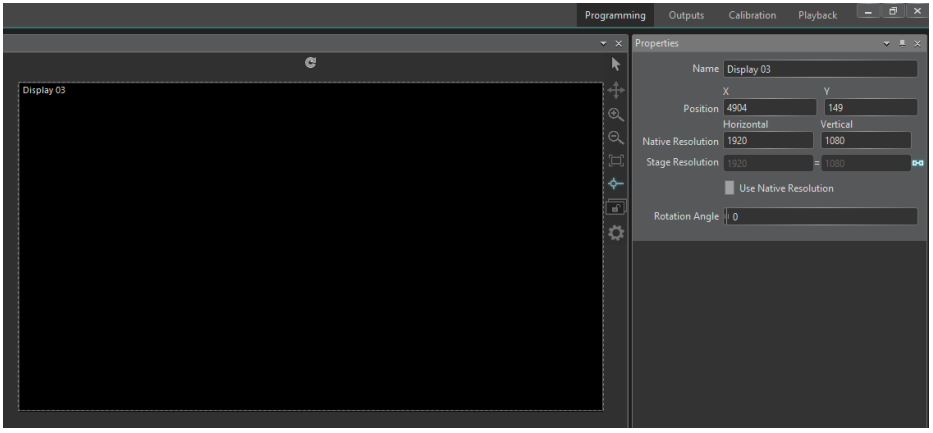


Figure H.3. Displays

A display is the equivalent of projectors or screens in 3D mode. It is an output that can be connected to a player. In 2D mode, the concept of display is more abstract than in 3D mode; it doesn't matter if the physical output is a projector or a screen. A display is defined by its resolution, along with its position in the scene and rotation.

Because all units in 2D mode are pixels, the resolution of a display can be defined both in stage pixels and native pixels. This is necessary to emulate differently sized displays with the same resolution. For instance, two HD screens of different physical sizes can be connected to your scene's displays, but if you want to have media transitioning between the screens that keep the same physical size, one display will need to be bigger in your scene, even if they have the same native resolution. The size in pixels in the scene is defined as the Stage Resolution. By default, the native and stage resolutions are the same. To have different values, uncheck the "Use Native Resolution" checkbox.

A display's properties can be modified in the Properties pane. The position, rotation, and size (if Use Native Resolution is unchecked) can also be modified by using an adorner in the Viewport, the same way as 2D media.

H.1.3 Controls

When in 2D mode, the controls in the Viewport are slightly different than in 3D mode. The Viewport can only be panned or zoomed. The mouse controls for those actions are the same, however the middle-mouse-button click-and-drag pans the Viewport, and the middle-mouse-wheel zooms in the Viewport. Use the left-mouse click to make selections. A right-mouse click opens a contextual menu based on the selected elements.

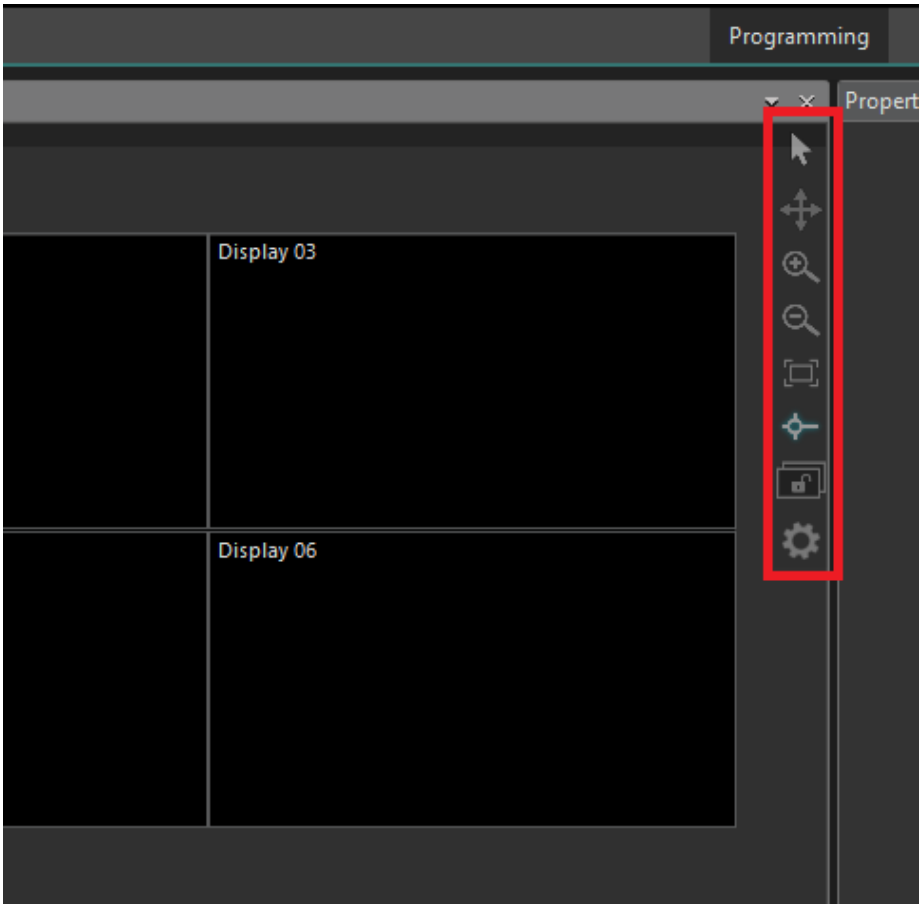


Figure H.4. Toolbar

A toolbar is also available to handle Viewport manipulation, along with other 2d-mode features. The Select, Pan, Zoom In, and Zoom Out tools allow you to use their respective manipulation modes. The Zoom-to-Fit icon centers the Viewport on the stage. The Snapping icon enables or disables snapping for displays and media element manipulation. The Lock Displays icon locks or unlocks the selection of displays. The Stage Properties icon shows the stage's properties in the Properties pane.

H.1.4 2D media manipulation

In order to move and resize media more easily when in 2D mode (or when in a screen in 3D mode), adorners, align and fit options, snapping, and other highly visual and interactive features are available. Most of an element's properties can be set by using the Properties pane, but these tools provide a generally more efficient and intuitive way to work with media.

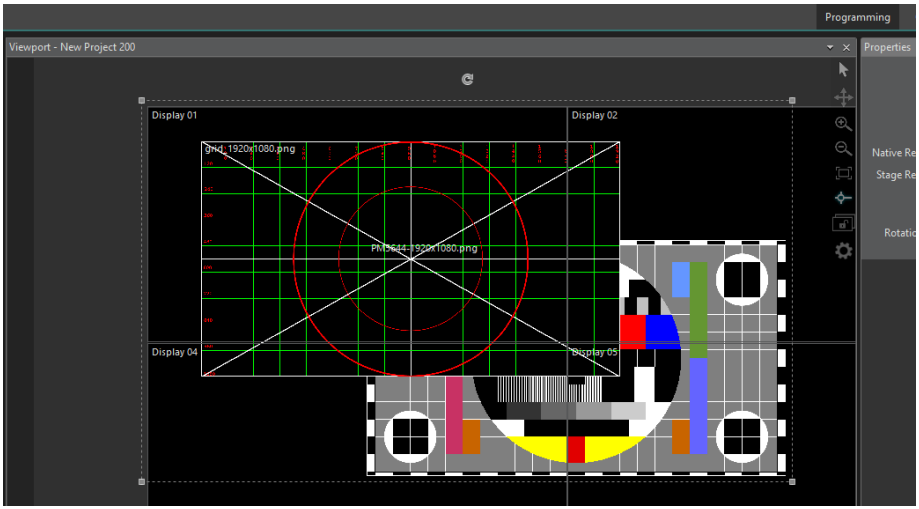


Figure H.5. 2D media manipulation

To add media to a Timeline in 2D mode, you can still drag the media on the Timeline, but it is also possible to drag the media directly in the Viewport. Doing so adds the media at the current playhead time on the current Timeline at the 2D position at which it was dropped in the Viewport. The layer on which the media is placed is the topmost free layer at the current playhead time.

Media can be manipulated in this way only when a Timeline is paused. Only the media displayed at the paused time can be selected and manipulated, and the media must be on the currently active Timeline. If a media satisfies these criteria, it can be selected in multiple ways. As in 3D mode, clicking on the Timeline element selects it. In 2D mode, it is also possible to select the media elements directly in the Viewport by clicking on them. A selection rectangle on left-mouse click-and-drag can be used to select multiple elements on the Timeline, as in the 3D mode, and also in the Viewport. Multiple selections can also be performed in the Viewport by using Ctrl-click.

Selected media show an adorner in the Viewport. The adorner can be used to move (by dragging the adorner), rotate (by using the rotate gizmo), and resize (by dragging the corners) selected elements. Hold the Shift key to preserve the aspect ratio while resizing. When moving media, snapping to adjacent elements can be toggled on and off by using the Viewport's toolbar icon.

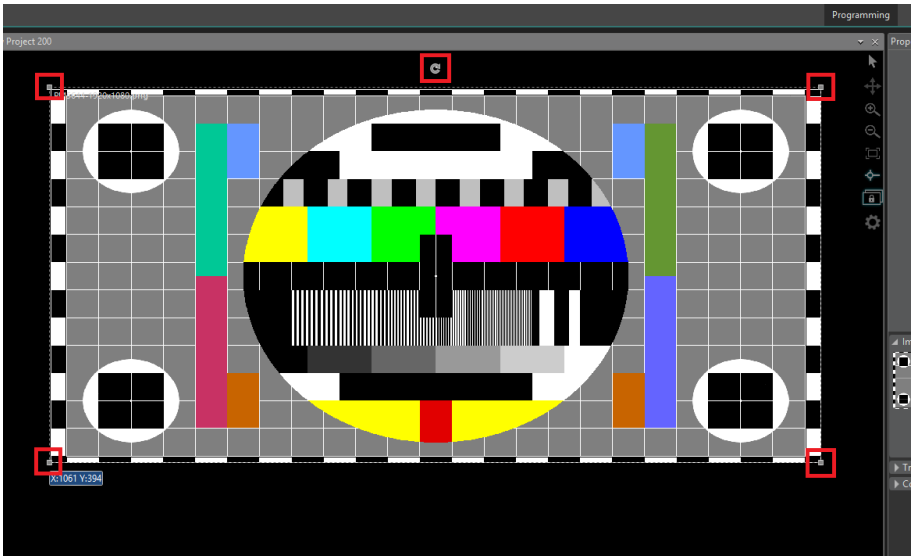


Figure H.6. Adorner manipulation

When multiple elements are selected, fit or align options are available to move and resize your media by using a right-click menu in the Viewport. The align options allow you to align multiple elements to the top, middle, bottom, left, right, or center of the selection. The fit options are available only when media and a display are selected. In 3D mode with a screen, the display is implicitly the screen, so no displays need to be selected. The fit options allow you to fit the media's width and height in relation to the display (Fit width or height, best fit or stretch).

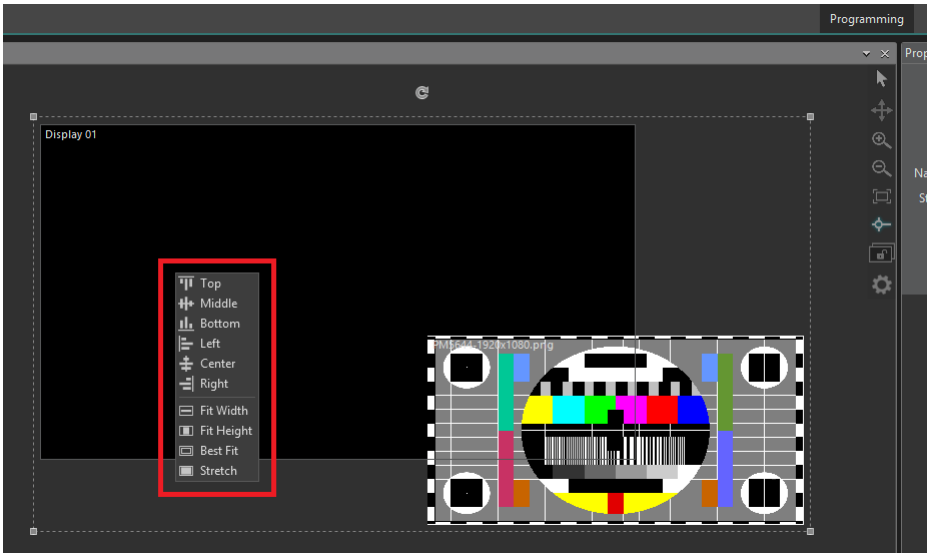


Figure H.7. Fit and Align

When Keyframing is enabled for a media's position, dimension, or rotation, using the 2D adorner instead applies the operation for the current time's Keyframe. For more details, see Keyframing.

H.1.5 Differences from 3D mode

- The Projection Study Layout and Projection Study Wizard are unavailable.

  All display creation and moving should be done in Programming Layout.
- The size and position of all elements are in pixels.

  There are no real-world units.
- The Content Production Tool is unavailable.
- Reverse Calibration is unavailable.

  Reverse Calibration works only in a 3D environment. The default calibration tool is Keystone.
- The 3D Scene Pane and 3D objects are unavailable.
- The list of Actions is limited to actions that are relevant to 2D.
- Settings and media properties are simplified.

H.2 X-Agora Agent

The X-Agora Agent runs on each computer in the X-Agora network, coordinating and synchronizing each player application in the network with the central server. In short, the agent links each machine with the brains of the operation—the server.

Figure H.8. Agent icon in the tray

Double-clicking on the Agent icon in the notification area opens the Agent interface, displaying the Configuration tab.

The Configuration tab allows you to point the Agent towards:

1. the X-Agora Player executable.
2. the media file directory.

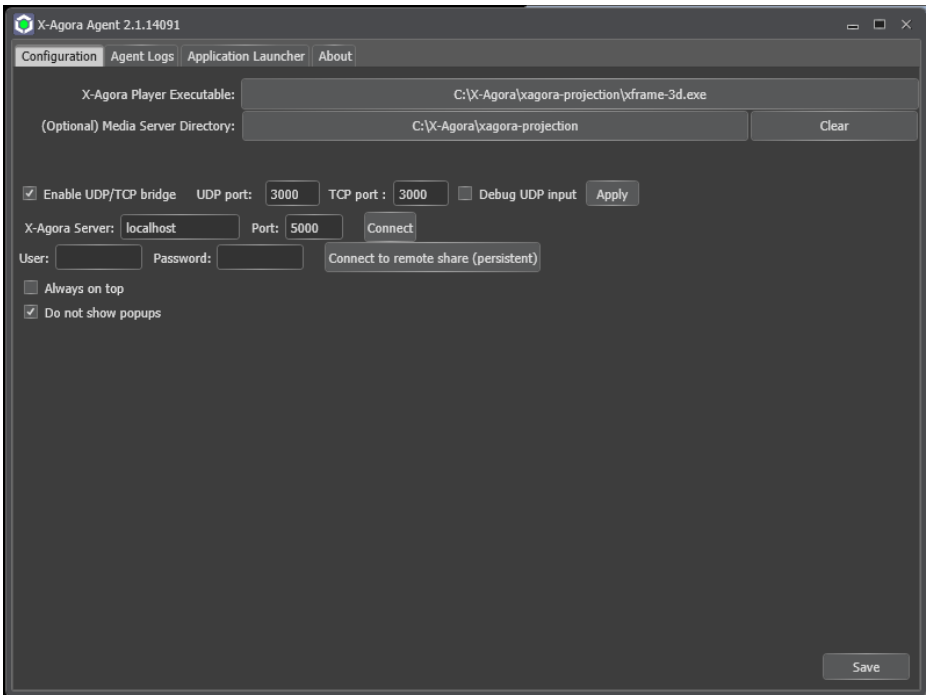


Figure H.9. Agent Interface

Clicking the Agent Logs tab exposes logs of the activities of the Agent, as well as its communication with the server. Logs are useful for debugging connection problems, or identifying missing media files.

X-Agora Agent 2.1.14091
Configuration
Agent Logs
Application Launcher
About
16:25:57.919 [debug] [T:2500] Launching UDP->TCP bridge, listening to UDP message on port 3000 and forwarding to TCP port 3000
16:25:57.919 [debug] [T:2500] TCP Bridge Server starting, data will be forwarded to TCP port 3000
16:25:57.949 [debug] [T:2500] The X-Agora Player path is "C:\X-Agora\xagora-projection\xframe-3d.exe"
16:25:58.669 [debug] [T:2500] The media server path is "C:\X-Agora\xagora-projection"
16:26:05.200 [debug] [T:3200] X-Agora Agent 2.1.14091 logged into server: 127.0.0.1

Figure H.10. Agent logs

H.3 X-Agora Media Encoder

X-Agora Media Encoder is a tool meant for encoding videos—either from image sequences or from existing videos—to eventually re-encode them. You can also use the Media Encoder to crop full-resolution image sequences or videos, creating video packages that conform to the crop definitions generated in your study. See the section Content Production for details on how to generate cropping templates to split your high-resolution media files for multi-screen output.

H.3.1 Application preferences

Go to **Tools** → **Preferences** (or type Ctrl-Q in the application) to open the application preferences.

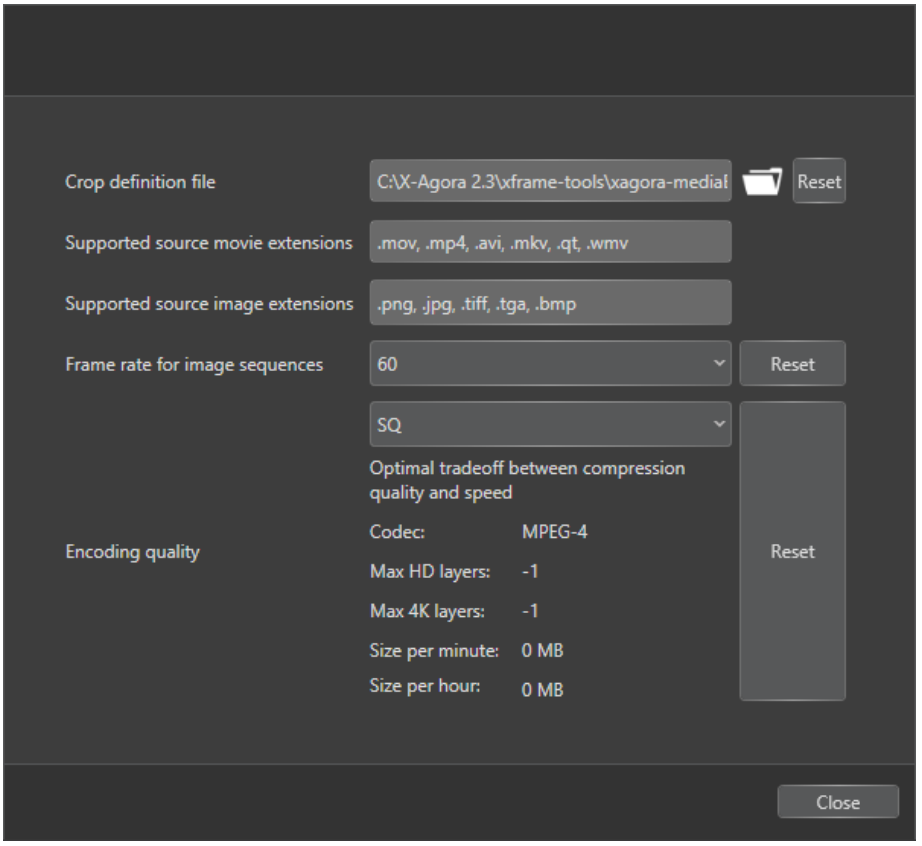


Figure H.11. Application preferences

Application settings

The dialog box displays the following information.

Crop definition file:	the global crop definition file. If encoding jobs are set to perform cropping and do not have a local crop file or are set to not use the local crop file, they will use this global crop definition file.
Supported source movie extensions:	a list of file extensions that X-Agora recognizes as movie files.
Supported source image extensions:	a list of file extensions that X-Agora recognizes as image sequences.
Frame rate for image sequences:	the frame rate to use for the output video of image sequences.

Encoding quality: encoding presets, with details about the output codec, maximum number of supported layers in X-Agora, and disk space estimates.

Click on the Reset button next to the setting to apply the default values of a setting.

Encoding presets

The X-Agora Media Encoder offers four encoding presets.

- **SQ:** Standard Quality (MPEG-4). This is the default preset, and it is the first one you should try, because it is the optimal tradeoff between compression quality and disk space.
- **HQ:** High Quality (x264). This preset performs some compression, but results in virtually unnoticeable quality loss.
- **XQ-S:** Extra Quality Small Files (x264). This preset performs lossless compression with relatively small files, but encoding and decoding are longer than usual.
- **XQ-L:** Extra Quality Large Files (FFVHUFF). This preset performs lossless compression with quick encoding and decoding, but the resulting files are larger than usual.

H.3.2 Single video encoding

To start encoding an image sequence, drag the folder containing the images inside the job list section. A new job appears in the list, and the new job can then be started, paused, or stopped. To re-encode a video, repeat the process by dragging the video to be re-encoded instead.

Videos produced in this manner can be dropped onto Timelines or the Media pane in X-Agora.

H.3.3 Video package encoding

Video package encoding is useful when the image sequence or video has been produced from a 2D or 3D template generated by the X-Agora Content Production Tool. A package is simply a folder containing the sub-sections of the content to be played by each individual projector output. The package contains several videos named after each projector's internal identifier. Follow these steps to use video-package-encoding packages:

1. Place the crops.xml file in a folder with the image sequence and import the folder into the Media Encoder.

   An encoding job appears in the list. You can also choose to globally apply a crop definition for all future encoding jobs by going in to the application settings.

2. Press **Play** to start the job.

3. Import the generated video package into the Media Pane of your project.
4. Place the package on a Timeline.
5. Select the package on the Timeline to expose its properties.
6. Enable the **Canvas Texturing** option.

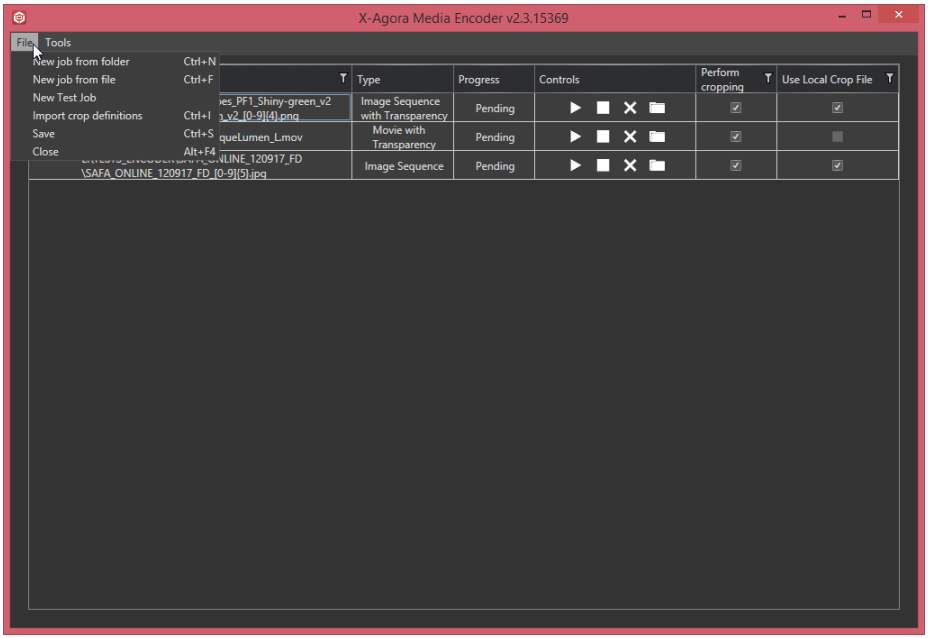


Figure H.12. Media Encoder

H.3.4 Encoding with transparency

X-Agora Media Encoder automatically detects the transparency in source media. For most encoding presets, the resulting media is split between a background media and a black and white mask to provide support for transparency. When a transparency is found, only **XQ-L** results in a single file with transparency.

H.4 Content Production

The Content Production tool allows you to produce image sequences for X-Agora.

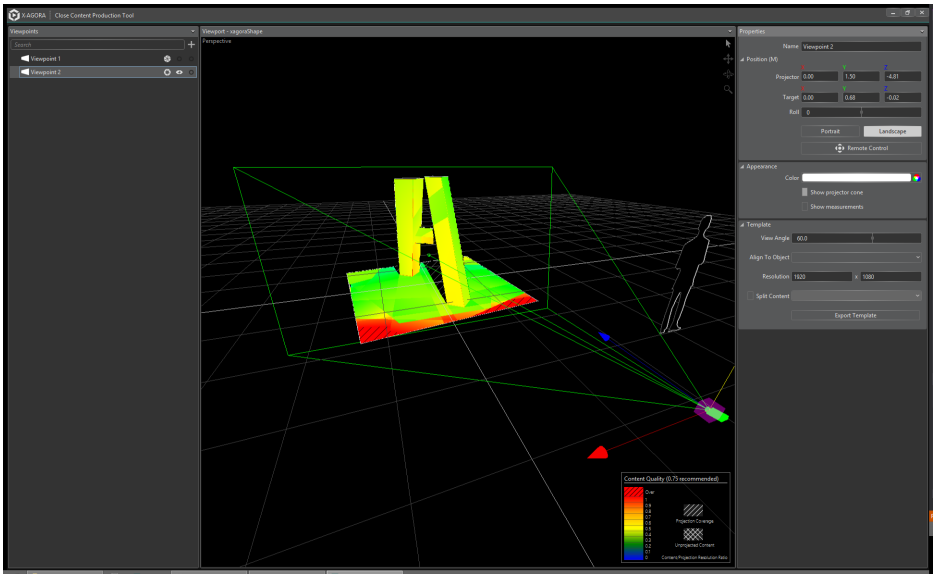


Figure H.13. Content Production tool

The Content Production tool allows you to:

- Create cropping templates for motion graphics and video artists tasked with creating content for large-scale, multi-screen or multi-projector pixel spaces.
- Visualize, with a special shading, the relationship between content pixels and projected pixels in order to find the optimal resolution for the templates.
- Visualize any discrepancy between projector coverage and template coverage, and vice versa.

H.4.1 Viewpoints

A Viewpoint is a virtual representation of a point of view from which content can be created by video and motion graphics artists. Content can be created for ISO or perspective templates. Most of the time you can use ISO, unless you are creating visual effects to be seen from a specific perspective.

H.4.2 Viewpoint properties

Viewpoints share many properties with projectors: Projector position, Target position, Roll, Portrait or Landscape orientation, Color, Show cone, and Show measurements. Other properties include:

Dimension/View angle: Defines the size of the area covered by the Viewpoint.

Align to object:	Aligns the Viewpoint to a selected surface. The Viewpoint is positioned to look at the surface, and its dimensions will be large enough to cover the surface entirely.
Resolution:	Defines the resolution of the Viewpoint, which becomes the resolution of the exported template.
Split content:	Specifies the projectors for which content produced from this Viewpoint will be cropped. Only one Viewpoint can be used to split content.
Export template:	Exports the image seen from the Viewpoint, which can be used as a template by the artists. If the Viewpoint has split content enabled, crops are also exported in a crops.xml file, and output an image defining all the crop regions.

H.4.3 Crops and packages

The Content Production tool allows you to generate a cropping template from a particular Viewpoint. See *Generating a cropping template (p.169)* for more information.

H.5 Remote mode

Use remote server mode to access a server from a remote machine on a local network.

For example, when you're doing calibration, it's usually practical to be able to move around the surface, something you cannot do easily from the server. With the Remote Server mode, you can just connect to the server using a laptop and continue your work seamlessly. Once calibration is done, you can just go back to your server and continue working on your project.

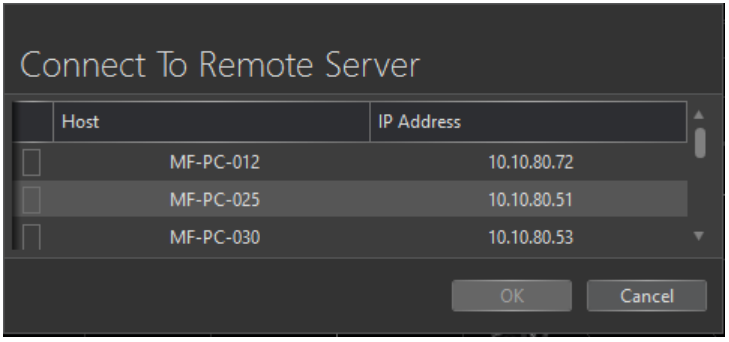


Figure H.14. Connect to Remote Server

H.5.1 To enter Remote Server mode

1. Select File > Connect to Remote Server.
2. Select from the list the host with which you want to connect, and select OK.

Note

The Agent must be running on the remote machine to which you want to connect. The window title changes to (Remote Control) if connection is successful.

Every action you do in Remote Server mode is now mirrored on the remote machine.

You cannot perform the following actions while in Remote Server mode.

- Create a New Project
- Add or delete media
- Import 3D models

H.5.2 To exit Remote Server mode:

1. Select File > Connect to Remote Server.
2. Select the localhost.

H.6 Live input

X-Agora allows you to integrate live video feeds into your show. Simply place a Live Feed media element on your Timeline and configure it to read your live video-capture hardware.

Note

Make sure your live video feed capture hardware is connected to the player machine that will output it to display hardware.

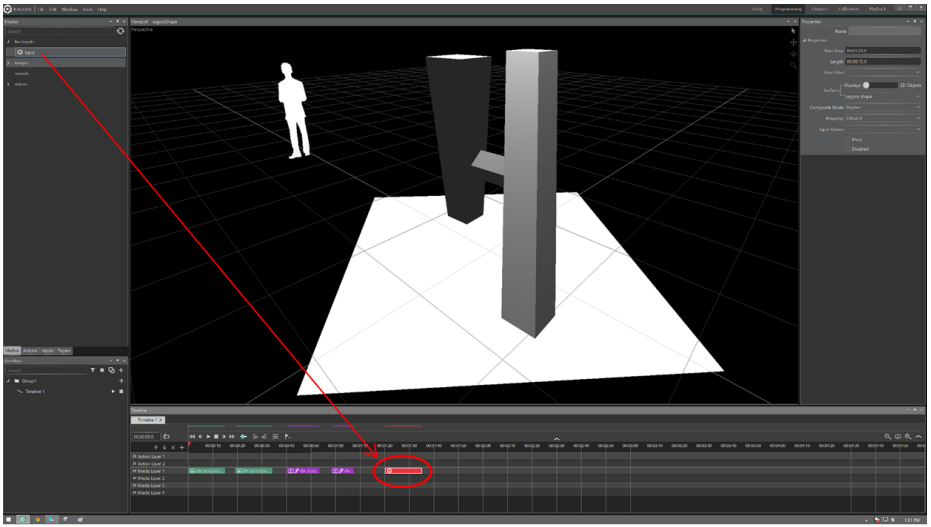


Figure H.15. Live input on the Timeline

1. Make sure you have a player configured in the Outputs layout and that the player's virtual inputs are properly mapped to the physical live-capture hardware that is connected to the player machine.

Note

Live-capture hardware must be connected to the player machine that will output the Live Feed visual.

2. Drag a Live Feed media element onto the Timeline in the Programming layout and select that Live Feed media element to expose its properties.
3. Select a virtual Input Device from the drop-down menu.

   This is the virtual input device was mapped to your physical input device in step 1.
4. Select a surface from the drop-down menu on which to display the Live Feed.

H.7 Keyframing

To enable Keyframing for a specific property, click on the orange diamond next to the keyframable property. See *Figure H.16, "Keyframe activation"*.

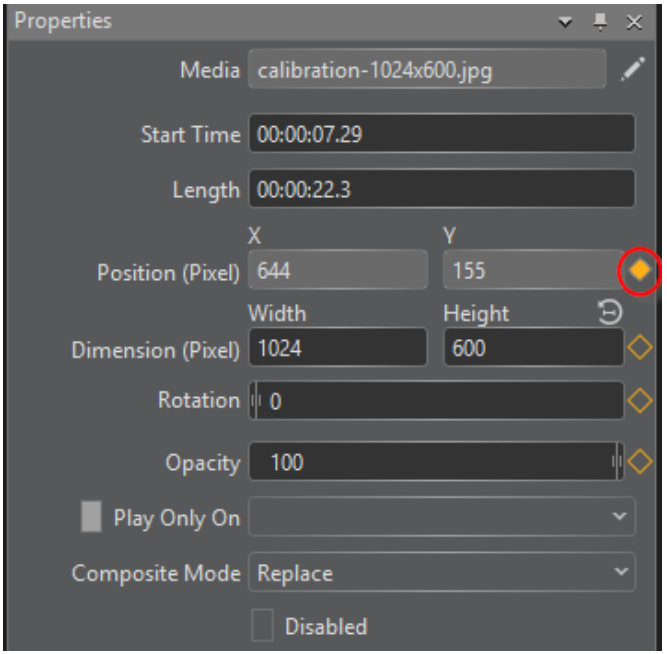


Figure H.16. Keyframe activation

Once activated, a keyframe layer appears on the lower section of the timeline. Each keyframe is represented by a diamond.

Figure H.17. A Keyframed Timeline Element

H.7.1 Animating an element's position

To animate the position of a media element, move the playhead forward in time and start dragging the media element. If you are in a 3D project, you must select a screen in the Viewport pane. When you drag the element, a line showing the actual path of the movement appears in the canvas. A yellow diamond shows the location in space of each keyframe, and the small yellow dots represent intermediate positions (every ten frames). You can judge how the speed of the element varies along the path. The further apart the points are, the faster the element is. See *Figure H.18, "Animated position trail"*.

You can repeat the process—move the playhead in time and drag the media element at the desired location—and keyframes are generated automatically.

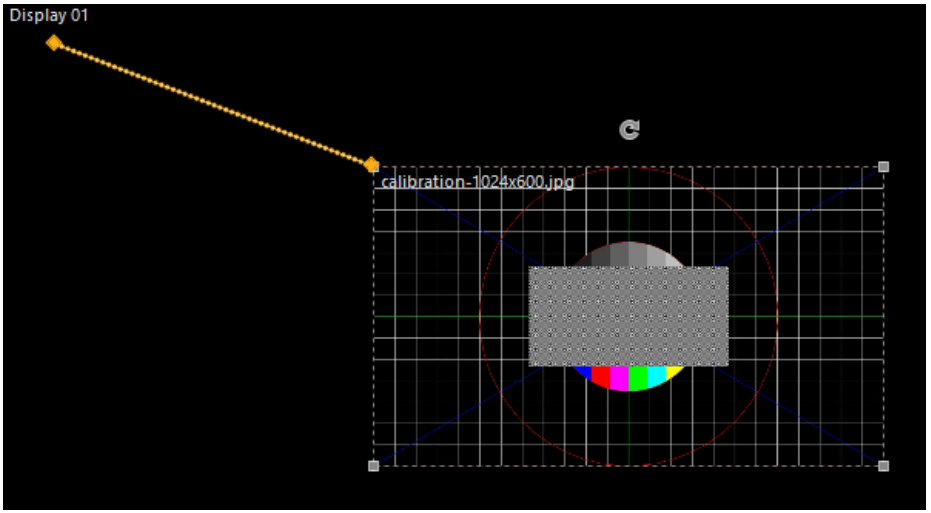


Figure H.18. Animated position trail

H.7.2 Inserting keyframes

For the position property, new keyframes can be inserted directly in the canvas by hovering the cursor over the path. When the cursor is over the path, a + appears next to the cursor, indicating that the next click will insert a keyframe at this location. See *Figure H.19, "Inserting a position keyframe"*.

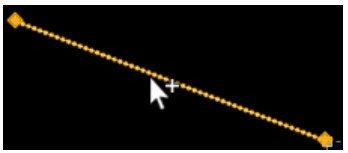


Figure H.19. Inserting a position keyframe

For non-position properties, new keyframes can be inserted in either of two ways.

1. Click on the plus sign on the left side of a keyframe layer, or
2. Unfold the layer to show the actual curve and hover the mouse at the desired location.

Figure H.20. Inserting a keyframe with the **+** button

Figure H.21. Inserting a keyframe by hovering

Notes to *Figure H.21, "Inserting a keyframe by hovering"*

1. Unfold the layer.
2. Hover and click to insert keyframe.

You can move the Keyframe left and right anywhere on the Timeline. Whenever a Keyframe-enabled property is modified, the value of the Keyframe at the current playhead position is updated. If no Keyframes are present at that time, one is created with the new property value. The interpolation between values can be either Spline or Linear. You can select the interpolation mode by using the icon next to the property name. You can also move between Keyframes by using the left and right arrows.

H.7.3 Tangent control

You can fine tune animation curves by manipulating the slope of the curve at each keyframe. To enable tangent control…

1. Make sure the interpolation mode is set to Spline by clicking on the Spline icon.
2. Unfold the animation layer to make the curve appear.
3. Click on a keyframe to make the tangents appear.

Once tangent control is enabled, you can click and drag the tangent endpoints to fine tune the shape of the curve.

Figure H.22. Tangent control

Notes to *Figure H.22, "Tangent control"*

1. Spline icon
2. Handle

By default, X-Agora ensures that the curve keeps a smooth slope, with no discontinuities. If you want to change that and allow the curve to have spikes and angles, select the keyframe and uncheck the "Symmetric" property.

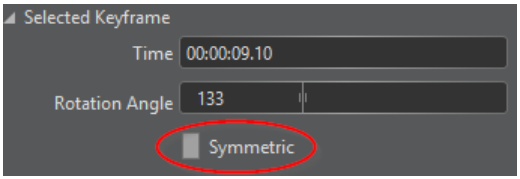


Figure H.23. Symmetric tangent property

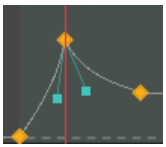


Figure H.24. Curve with non-symmetric keyframe tangents

Appendix I: Workflow layouts

The right-hand side of the menu bar at the top of the X-Agora interface allows you to choose from among the five workflow layouts in X-Agora: Study, Programming, Outputs, Calibration, and Playback.

I.1 Project Study layout

Assessing and documenting the various options for projector placement, and the advantages or disadvantages for each option, is referred to as a "projection study." The Projection Study layout allows you to generate detailed technical plans of projector placement options.

To switch into the Projection Study layout, select Study from the menu bar in the top right-hand corner of the X-Agora interface, as shown in *Figure I.1, "Study on the menu bar"*.

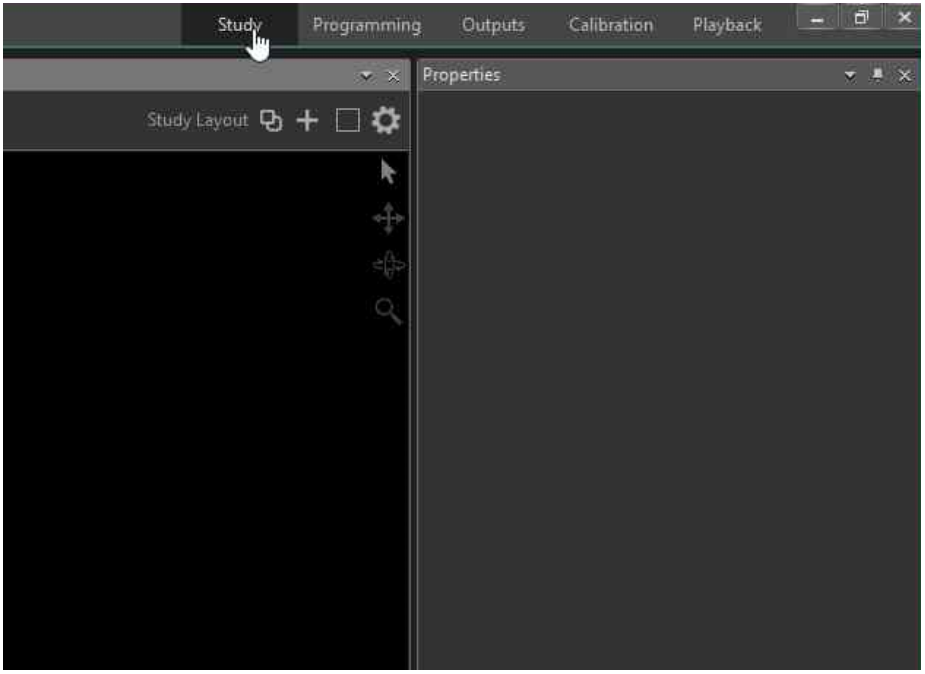


Figure I.1. Study on the menu bar

I.1.1 Layout purpose and workflow

The Projection Study layout is mostly used in the initial phases of a production. It is the layout best suited for creating your 3D scene and arranging your displays. You can create multiple display configurations, and produce a study document to detail and evaluate each configuration. If there is no need to produce such documents, you should still use the Projection Study layout to create your scene and displays, because this layout has features that may help people working at a more technical level: technical directors, architects, and integrators.

The usual workflow in the layout as follows:

1. Create your 3D scene.
2. Create and set the properties of displays, and evaluate the luminance and resolution quality of your display or projector configuration by selecting a visualization mode.
3. Create and arrange pages for the printable document that details crucial information concerning the advantages and disadvantages of each configuration.
4. Export or print the resulting document.
5. Repeat steps 2 to 4 for different display configurations if necessary.

Optionally, for complex projects, once a final display configuration has been chosen, use the Content Production tool to create 2D templates for the artists to work in the scene. If your project contains only flat surfaces, this step can be ignored, because the mapping of media on flat surfaces can be done easily by using the media element properties in the Programming layout.

I.1.2 Viewport

The Viewport pane is where most manipulation and visualization of your 3D scene occurs. Because most 3D object manipulation should be done in this layout, it is important to know how the Viewport works. See *Viewport (p.124)*.

I.1.3 Scene creation workflow

The workflow to create the 3D objects and displays in the Projection Study layout depends on what type of project you are creating and what are the possible display configurations. The workflow presented here is one for the most complex projects, where external geometries need to be imported. Depending on the nature of projects, some of these steps may be omitted or altered.

1. Import a 3D model (.fbx, .obj, .dwg, .dxf, .svg).

   For CAD file formats (dwg, dxf, svg), if you want to project on the imported model, it must be made out of faces and not only lines.

Importing 3D objects in X-Agora can be done in many ways; see *Importing 3d objects (p.155)*.

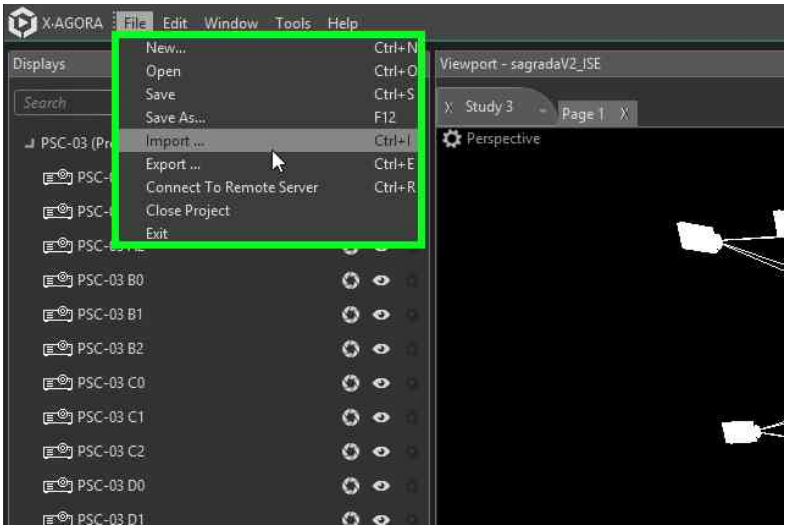


Figure I.2. Import 3D model

2. Make sure that the imported model's scale is in proportion to the X-Agora 3D space and that it is properly positioned.

    a. The default unit scale of the X-Agora 3D space is 1 unit = 1 m.

    b. To adjust the scale or position of your model, select the model in the player Viewport or the 3D Objects pane and then click on the **Properties** tab to expose its position, scale, and dimension properties.

    c. To change between metric and imperial units, go to the application settings.

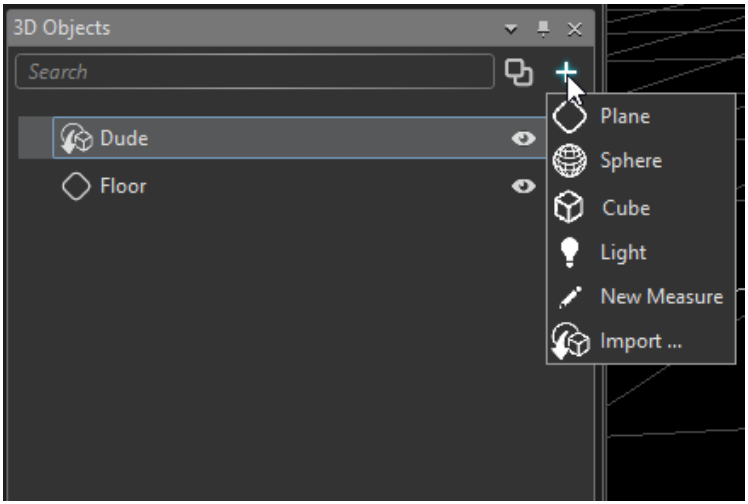


Figure I.3. Create a 3D object

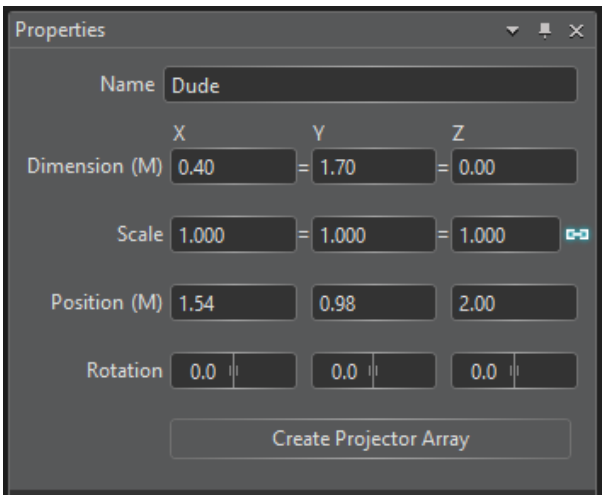


Figure I.4. 3D Object Properties pane

3. Create projectors to cover the imported projection surfaces using the Create Projector Array function.

   If you select a single object and click on Create Projector Array in the Properties pane, X-Agora automatically detects the projection area by choosing the biggest surface of the selected model. The Projection Study Wizard then creates the required number of projectors.

Note

In the event that you are using X-Agora to project onto a traditional flat surface (screen or otherwise), you can use the Projection Study Wizard from the Tools menu. This creates a projector array and also a screen that can be used as a projection surface. When using the Projection Study Wizard this way, you can manually enter the coverage area dimensions.

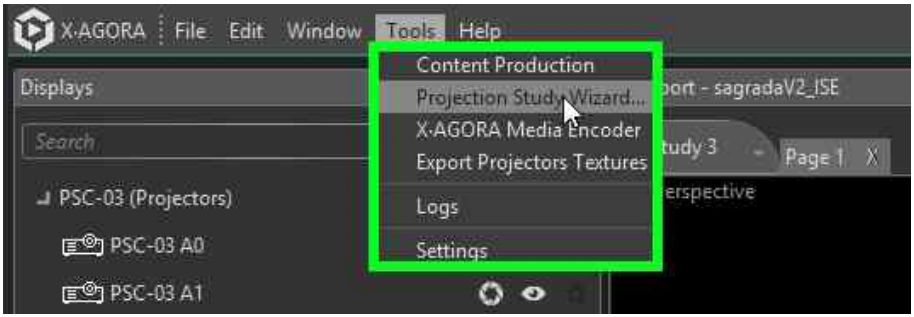


Figure I.5. Projection Study wizard

I.1.4 Importing 3d objects

Importing 3D objects in X-Agora can be done in many ways. You can import objects by using the File menu of the X-Agora interface, the Add Object menu of the 3D Objects pane, or by dragging a valid file directly in the Viewport. X-Agora can import many file formats, however, because each file format stores different information, not all file formats have the same possibilities once they have been imported.

The supported file formats are .fbx, .obj, .dwg, .dxf and .svg. Those file types can be separated in two categories: modeling software formats (.fbx, .obj) and CAD drawing formats (.dwg, .dxf and .svg). The most complete file format for X-Agora is .fbx, however you may not have control over which of those formats can be used, because the models are usually provided by an external source. (See *Supported 3D formats (p.206)* for more information.)

I.1.5 Using the Projection Study Wizard

Using the Projection Study Wizard, you can easily define a projection pixel space in your 3D scene. Once your model has been imported, you can use the Projection Study Wizard to automatically generate an array of projectors to cover the specified pixel space. The Projection Study Wizard can also create a screen that matches the pixel space.

To open the Projection Study Wizard, select the Tools in the menu bar, and select Projection Study Wizard from the Tools menu. You can also select an object from your scene and click the Create Projector Array button in its properties.

Projection Study workflow

1. *If no object is selected*, choose between aiming the projectors horizontally at a Wall or vertically at a Floor.
2. *If no object is selected*, define projection dimensions.
3. Adjust "Distance"/"Throw ratio."

   Keep in mind that these are relative parameters. Change one, and the other is adjusted proportionally.
4. Choose an aspect ratio setting.

   "Auto" mode chooses a combination of aspect ratios to best conform to the desired coverage area. Alternatively, you can set all projectors to a fixed aspect ratio.

I.1.6 Projection Study Wizard interface

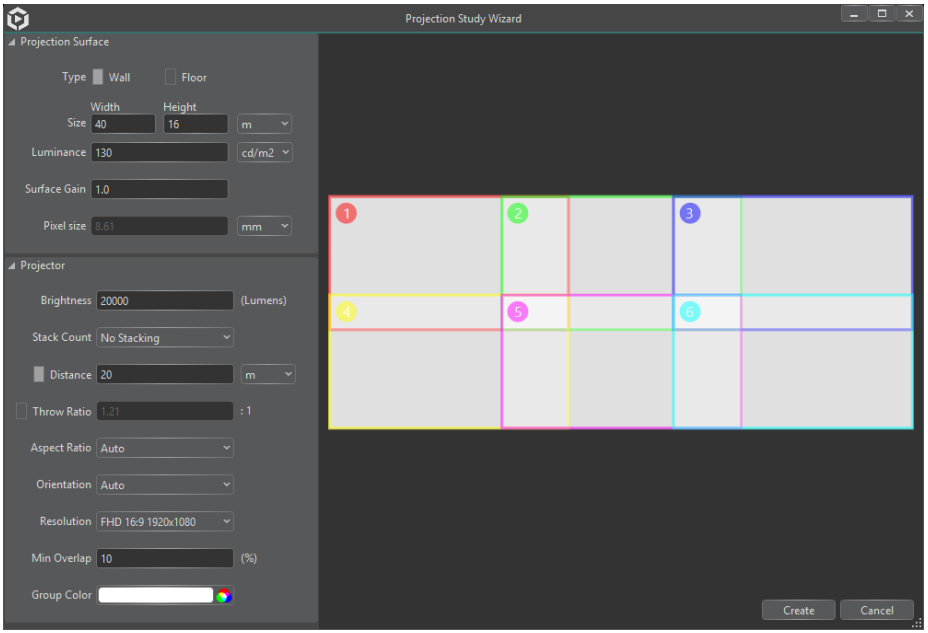


Figure I.6. Projection Study Wizard interface

Projector surface

Use these settings to simulate the physical surface that will be projected upon.

Type: This setting, Wall or Floor, defines the orientation of created projectors.

Size:	Size defines the pixel space in m, cm, mm, ft, or inches.
Luminance:	Luminance of the projection surface in candela per square meter (cd/m^2) or candela per square foot (cd/ft^2). This parameter should generally remain the default setting of 130, unless projection is to take place in a bright environment, such as outdoors during the day.
Surface Gain:	Surface gain is the extent to which the surface on which you are projecting absorbs or reflects light. Values fall between 0.0 (100% absorption) and 1.0 (100% reflection).
Pixel size:	Pixel size defines the physical width of a projected pixel in millimeters.

Projector

Use these settings to simulate the physical surface that is to be projected upon.

Brightness:	Simulates real-world projector brightness setting.
Stack Count:	Represents the number of projectors per stack.
Distance:	Measures the distance of the projectors from the projection surface.
Throw Ratio:	This is a property defined by the quality of the lens used on the projectors.
Aspect Ratio:	"Auto" mode automatically chooses aspect ratios for optimal coverage.
Orientation:	"Auto" mode determines a combination of projector orientations to guarantee optimal coverage.
Resolution:	Represents the resolution of each projector in the array.
Min Overlap:	Shows a percentage of overlap between each projector.
Group Color:	Shows the color of the group of projectors being created.

I.1.7 3D objects pane

The 3D Objects pane provides a list of all the 3D objects in your scene. It also allows you to select them individually in order to highlight them in the *Viewport* and expose their parameters in the *Properties pane*. For more information, see *3D objects pane (p.108)*.

3D Objects workflow

1. To expose and edit the properties of a 3D object, select the object in the 3D Objects pane.

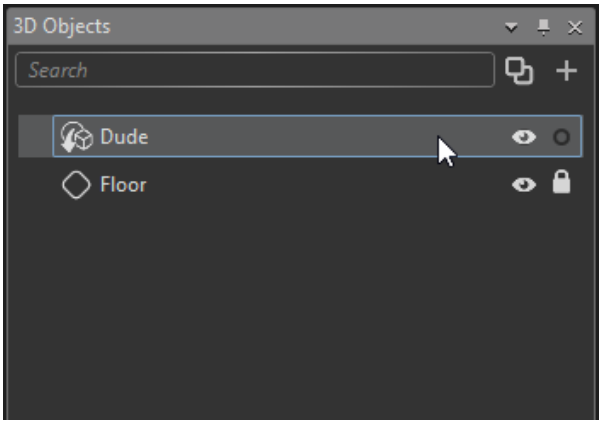


Figure I.7. 3D Objects pane

2. To import or create a new 3D object, or to create a New Measure, press the + button on the top right of the 3D Objects pane.

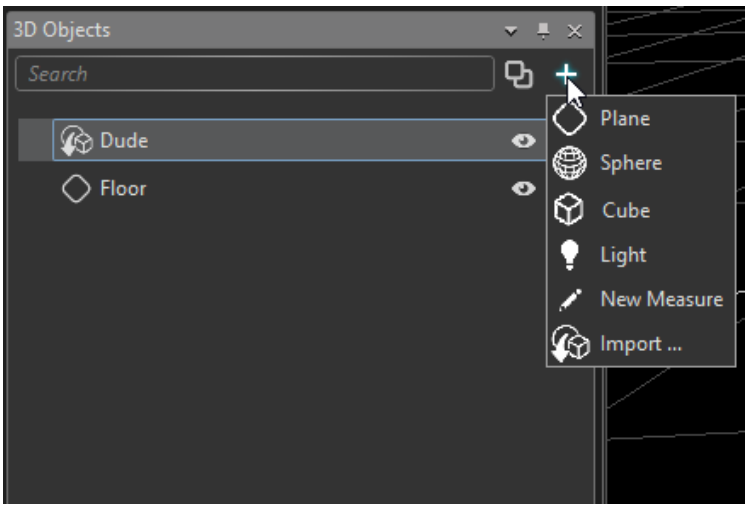


Figure I.8. Create a 3D Object

Use the + button to create a 3D primitive (a plane, sphere, or cube), to create a light or Measure, or to import a 3D model created with third-party 3D modelling software. Each object in the 3D Objects pane can be renamed, duplicated, hidden, or locked.

Measures workflow

Measures are powerful tools with many uses. A Measure can be used to calculate a distance between objects, display this information on a page, or to resize an object based on a known real dimension.

When you create a Measure by using the 3D Objects pane, the Measure's properties appear in the Properties pane.

Follow these procedures to create and manipulate a Measure:

1. Click the **+** button in the top right-hand corner of the 3D Objects pane.
2. Select **New Measure** from the drop-down menu.
3. Enter a name for the Measure.
4. Click on the target icon next to First object to pick the first point.

   Clicking on and dragging an object in the 3D view changes its position.

   Position can also be adjusted manually by entering the coordinates in First Position (M) fields.
5. Click on the target icon next to Second object to pick the second point.

   Clicking on an object in the 3D view causes the measurement to appear automatically between the two objects in the 3D view. Moving one of the two objects also moves the Measure and changes its Distance property.
6. Click on the Color picker icon to modify the color of the measurement.
7. Click on X/Y/Z Decompose to decompose the Measure on the X, Y, and Z axes.
8. Click on the Detach icon to detach a Measure.
9. Press delete when a Measure is selected to delete the Measure.

I.1.8 Displays

Once you have created your displays (either manually or by using the Projection Study Wizard), you can make adjustments to your displays by using the Displays pane, which can be accessed in the Projection Study layout or from the Window tab on the menu bar at the top of the screen. Once you have created your displays (either manually or by using the Projection Study Wizard), you can make adjustments to your displays by using the Displays pane, which can be accessed in the Projection Study layout or from the Window tab on the menu bar at the top of the screen.

For more information, see *Displays pane (p.93)*.

I.1.9 Studies and pages

Projection Studies

A projection study is a configuration of displays in your scene. When creating a new project, a default study is created, but you can add more studies if you need to assess different display configurations. These studies contain pages, showing different elements of your study, which can be printed or exported to PDF. The layout of what is printed or exported is "WYSIWYG," what you see in the Viewport is what you get in your document.

- To create a new Projection Study, click on the **+** in the Study layout toolbar, in the upper right-hand corner of the Viewport, and select **New Study** from the drop-down menu.

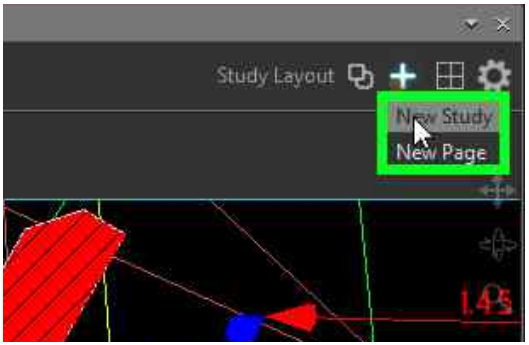


Figure I.9. New Study

- To switch between Projection Studies, click on the **Default Study** tab in the upper left-hand corner of the Viewport, and select a study from the drop-down menu.

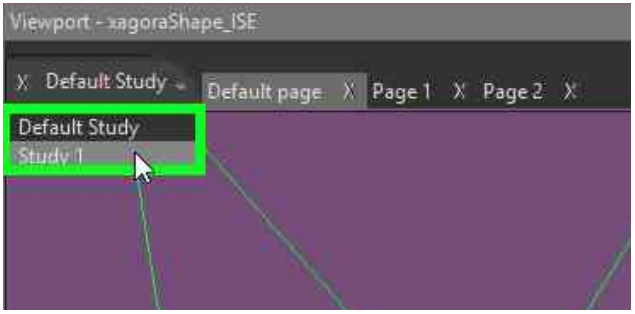


Figure I.10. Switch between Projection Studies

Pages

- To create a new Page in the current Projection Study, click on the **+** in the Study layout toolbar, in the upper right-hand corner of the Viewport, and select **New Page** from the drop-down menu.

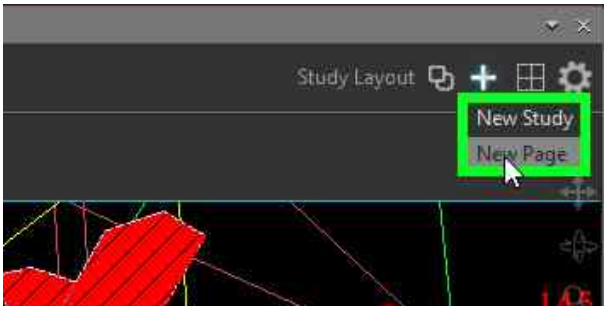


Figure I.11. New Page

Pages have different properties, which the Properties pane displays, when you click on the Page tab in the Viewport. Pages can be printed or exported to PDF from the Properties pane of the page.

Visualization mode

Visualization modes are among the most crucial features of Pages. Each visualization mode displays a heat map to indicate areas of high and low quality luminosity or resolution, based on display placement.

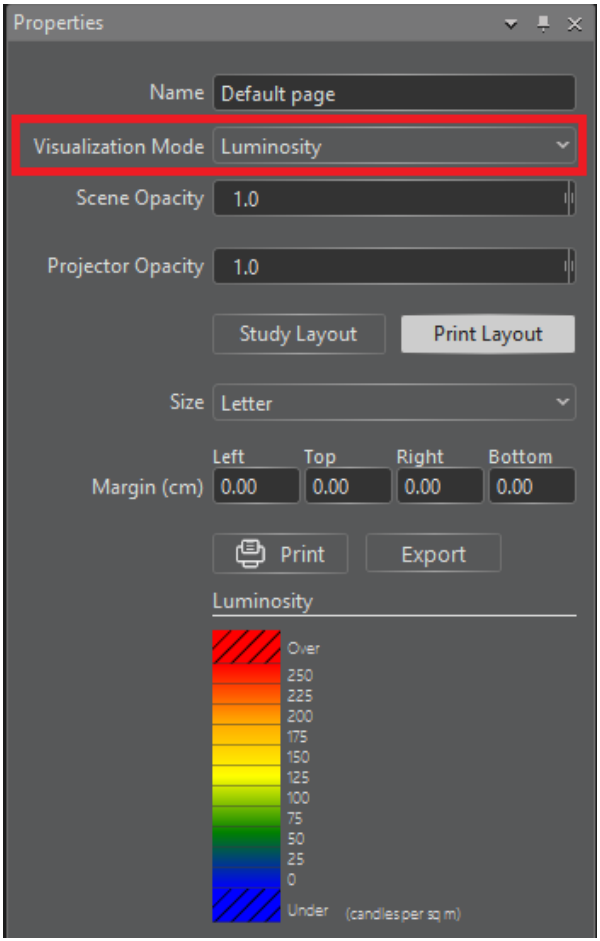


Figure I.12. Visualization mode

Luminosity visualization mode indicates the luminosity quality across the projection surface.

Resolution visualization mode indicates the resolution quality (or pixel density) across the projection surface.

The minimum and maximum values for the heat map can be set in the Settings pane. The heat map displays values from blue to red. Values under the minimum or over the maximum are shown with diagonal stripes. The heat map's scale is displayed in print layout. It can also always be seen in the Properties pane of the Page.

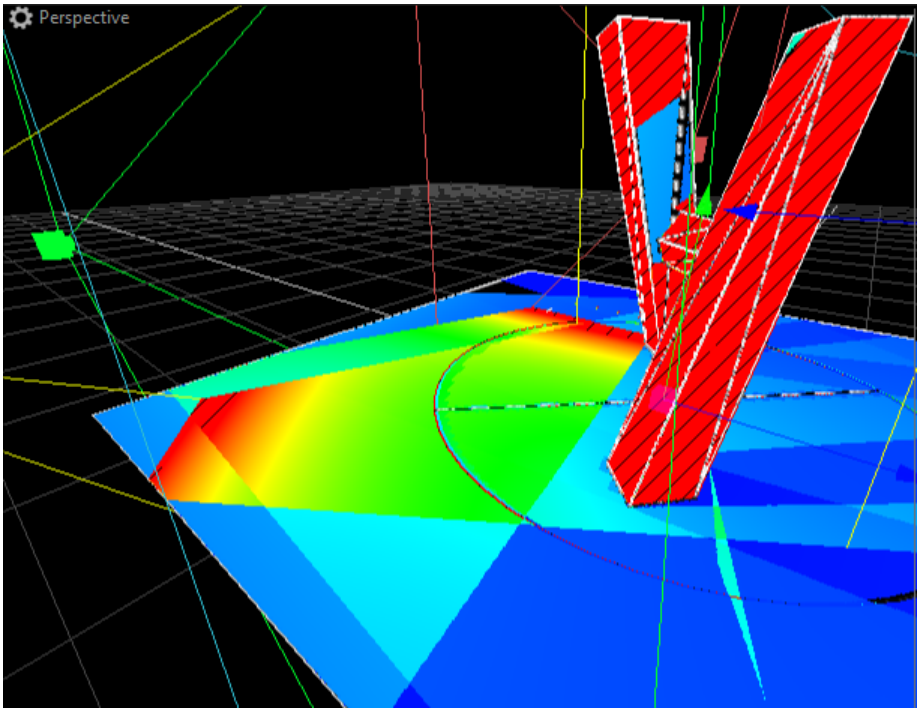


Figure I.13. Heat map

Print Layout

Two different layouts are available in the Viewport. The default layout is the *Study Layout*, which is 3D-manipulation friendly. The other layout is the *Print Layout*, which is the layout used to prepare a page for printing.

To switch to Print layout, click on **Study Layout** on the toolbar in the upper right-hand corner of the Viewport, and select **Print Layout** from the drop-down menu.

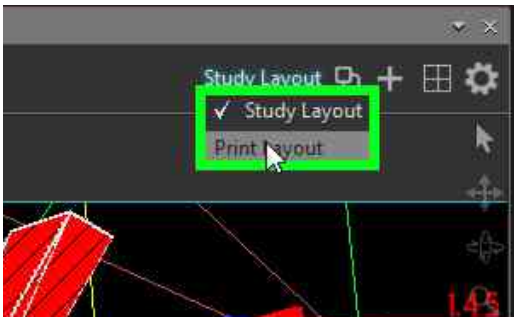


Figure I.14. Change to Print layout

More print-specific features are available in the Print layout.

- The Projector Specifications appear, showing the specifications of all the projectors in the projection study.
- The Cartouche appears on the right of the Viewport.

  In the Cartouche, you can specify a logo, a company name, an author name, revisions, and notes.
- Notes can also be added anywhere in the Viewport, with any text.

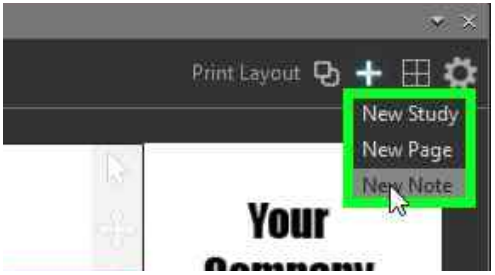


Figure I.15. New note

The Projector Specifications, the Cartouche, and the Notes can be shown or hidden for each page. To show or hide these items…

1. Click on the Extras icon in the toolbar, in the upper right-hand corner of the Viewport.
2. Click on **Show Notes**, **Show Cartouche**, or **Show Projector Specifications** to toggle them On or Off.

   A checkmark indicates that the item is toggled On.

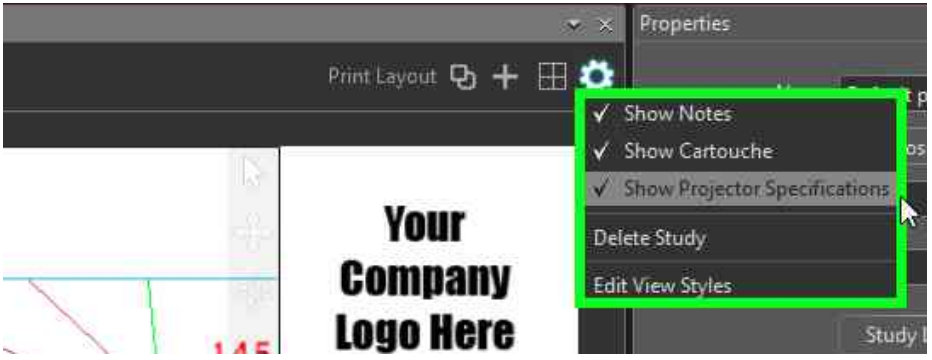


Figure I.16. Hide elements of Print layout

View styles

View styles allow you to customize how content is visualized, and can be used either for Print layout or Study layout. A view style defines the colors to be used for the background, the edges, and the objects.

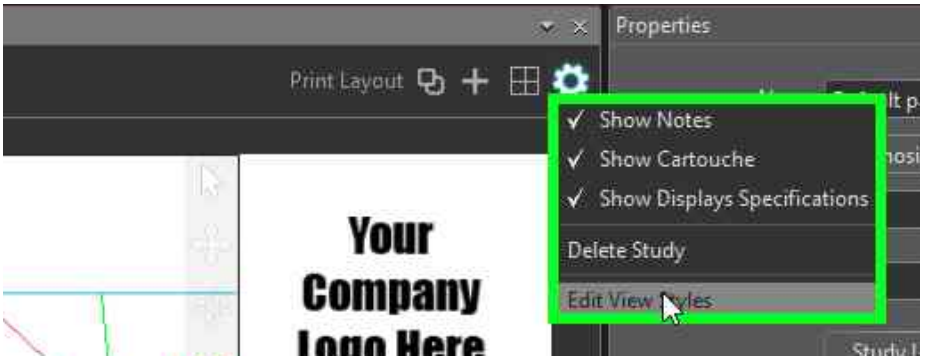


Figure I.17. New view style

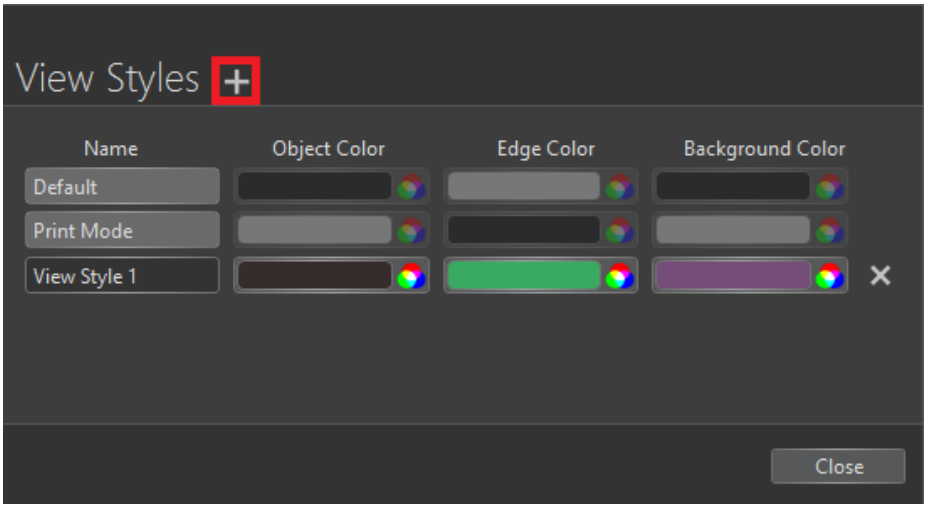
- 

Figure I.18. Assign View Style 1

- To assign a view style to a view...

    1. Click on the Extras icon in the upper left-hand corner of the desired view.
    2. Select **View Style**.
    3. Select the view style, for example, **View Style 1**, from the drop-down menu.

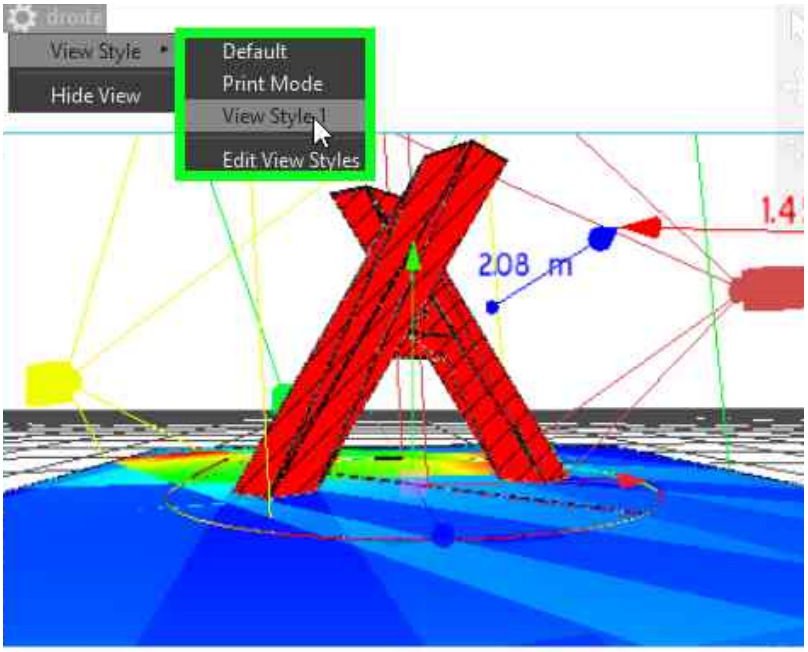


Figure I.19. Assign View Style 2

I.1.10 Exporting templates with the Content Production tool

For a description of the Content Production tool, see *Content Production (p.142)*.

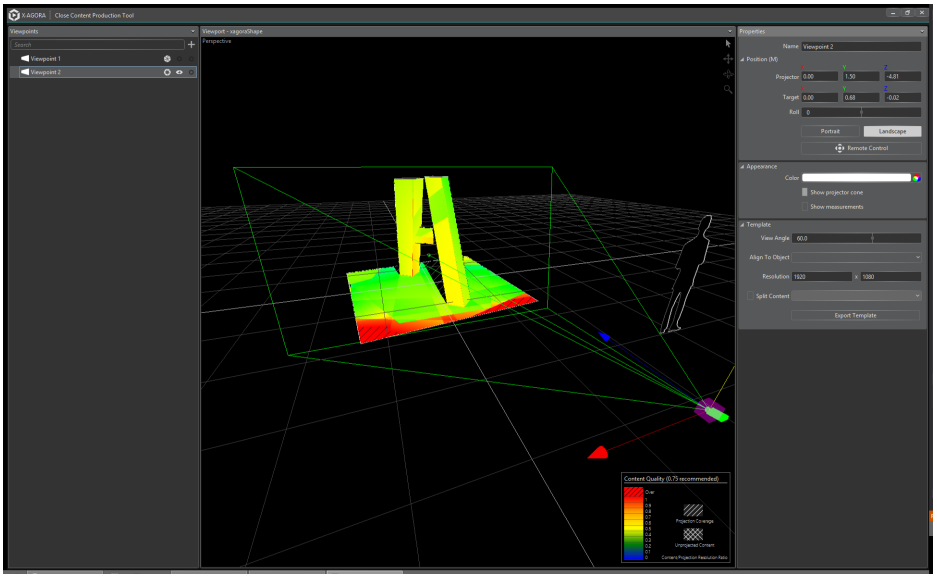


Figure I.20. Content Production layout

The Content Production tool allows you to:

1. Create cropping templates for motion graphics and video artists tasked with creating content for large-scale, multi-screen or multi-projector pixel spaces.
2. Visualize the relationship between content pixels and projected pixels with a special shading, in order to find the optimal resolution for the templates.
3. Visualize any discrepancy between projector coverage and template coverage, and *vice versa*.

Viewpoints

A viewpoint is a virtual representation of a point of view, from which content can be created by video and motion graphics artists. Content can be created for ISO or perspective templates. Most of the time ISO can be used, unless you are creating visual effects to be seen from a specific perspective.

Viewpoint properties

Viewpoint properties share many of the same properties as projectors: Position, Target position, Roll, Orientation, Color, Show cone, and Show measurements.

Dimension/View angle: Defines the size of the area covered by the viewpoint.

Align to object:	Used to align the viewpoint to a selected surface. It will be positioned to look at the surface, and its dimensions will be large enough to cover it entirely.
Resolution:	Resolution of the viewpoint, which will be the resolution of the exported template.
Split content:	Specifies the projectors for which content produced from this viewpoint will be cropped. Only one viewpoint can be used to split content.
Export template:	Exports the image seen from the viewpoint, which can be used as a template by the artists. If the viewpoint has split content enabled, crops are also exported in a crops.xml file, and an image defining all the crop regions is produced.

Generating a cropping template

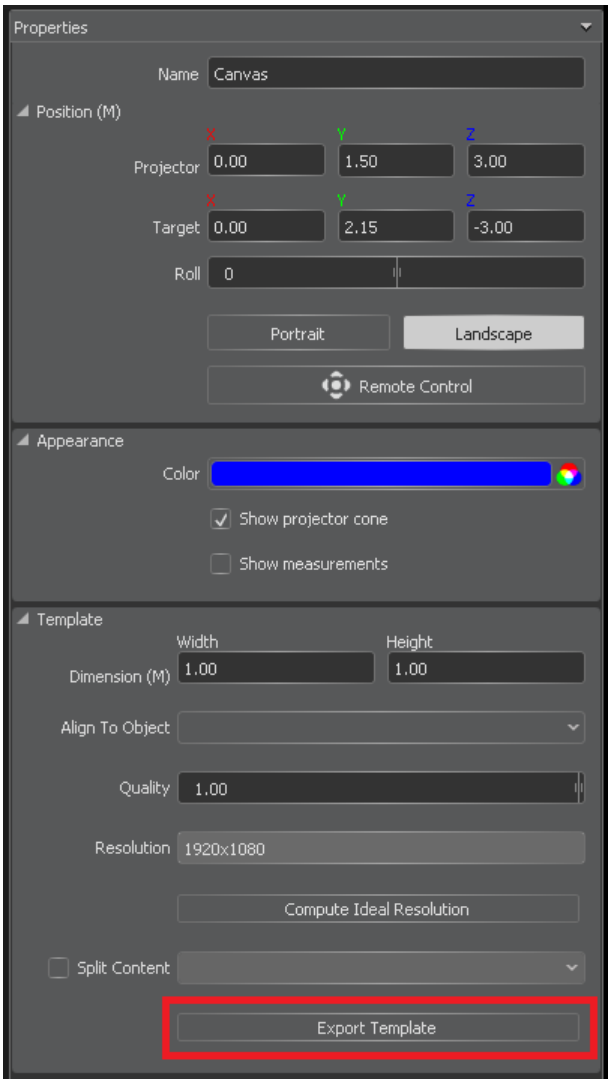


Figure I.21. Export template

To generate a cropping template from a particular viewpoint:

1. Select the viewpoint in the Viewpoints pane to expose its properties in the Properties pane.
2. Click on the **Export Template** button in the Properties pane.
3. Save your template **.xml* file in a folder, from which you can retrieve it for use with the Media Encoder tool.

4. Use the cropping template to crop content with the Media Encoder.

   This produces a video package. The package can be dragged on the Timeline like a video. To output the package from multiple player machines, enable the "Canvas texturing" option for the video element.

Working with UV mapping

The use of content viewpoints can be limiting in some situations, for example:

1. Video projectors surround the projection surface on which you expect to project from all angles.
2. The projection surface surrounds the video projectors.

In both scenarios, using a single content viewpoint is not enough to cover the whole projection surface. In those situations, you might consider using the UV mapping technique to achieve an 'all-around' projection.

UV mapping consists of unfolding a 3D model onto a flat surface, like a piece of clothing is composed of multiple cut of 2D pieces tied together. This 2D unfolded version of the model can then be exported as a 2D image, so that artists can draw into it, as they would do inside a content viewpoint. The main difference is that a custom-made UV map allows coverage of ALL desired angles for the projection surface.

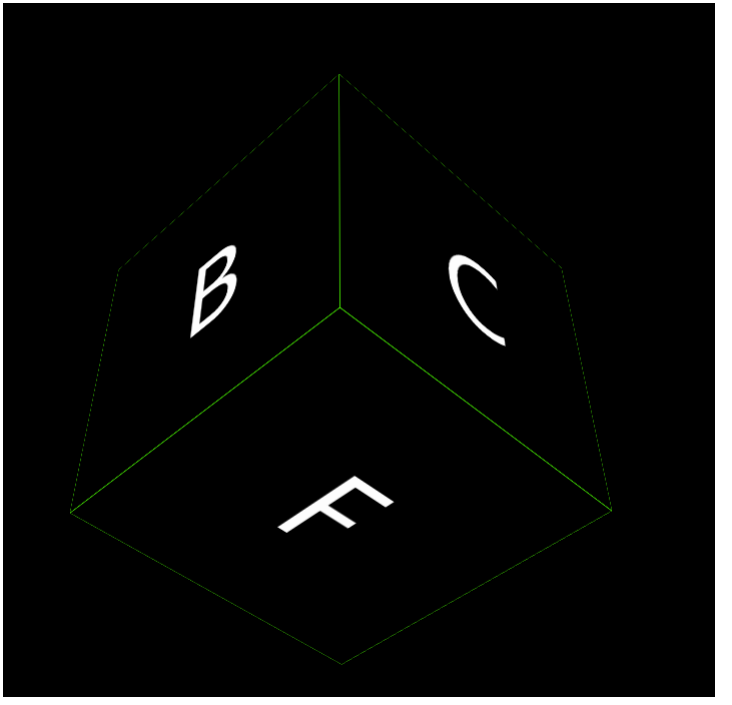


Figure I.22. 3D cube

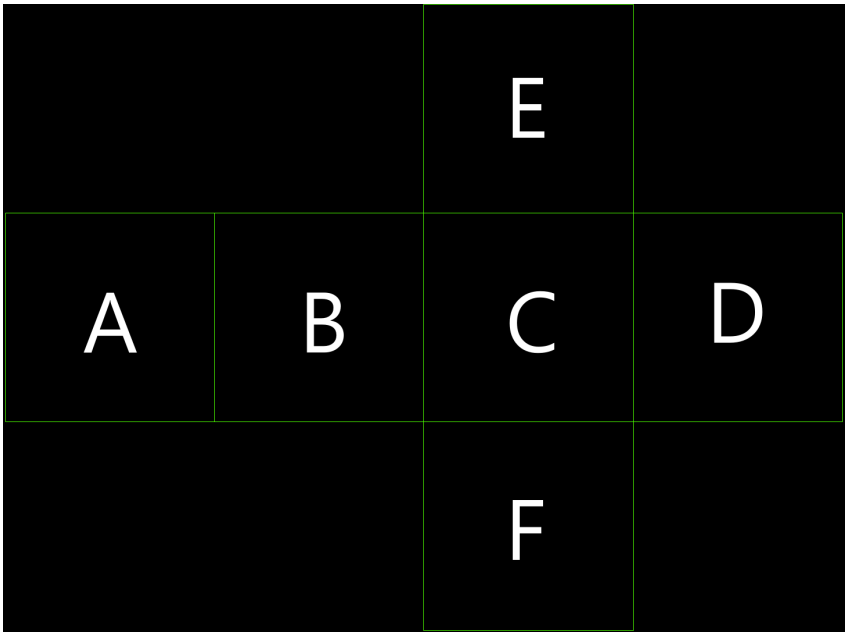


Figure I.23. Cube UV map—unfolded

X-Agora does not include a UV Editor, and the "unfolding" process (called UV mapping) of the 3D model should be done in a specialized 3D authoring software like 3DsMax, Maya, Blender, etc. Then, simply export the 3D model into the fbx format to be loaded in X-Agora. By default, all the content applied to the imported 3D object uses the UV map exported with the fbx model.

It is also possible to use multiple UV maps, meaning different ways (called channels) to unfold the 3D model, in the same fbx, and choose any map when applying videos or images to the 3D model. To do this, in the Mapping property of the media in the timeline, choose the channel you desire. There is a choice of up to 4 channels (UVSet0-3). By default, the first one is used.

I.2 Programming workflow layout

Once you have completed your projection study, select Programming from among the workflow layouts on the right-hand side of the menu bar and start building content Timelines.

I.2.1 Layout purpose and workflow

The Programming tool allows you to build content Timelines. X-Agora allows you to create as many Timelines as you want in each X-Agora project. Because it was designed for large-scale installations, X-Agora also allows you to playback multiple Timelines simultaneously. Large-scale installations often have multiple screen spaces, and often it is easier to compartmentalize content for each screen space on a dedicated Timeline. This is where Timeline Groups are useful for such compartmentalization. Timeline Groups allow you to group together multiple Timelines in order to control them simultaneously or assign them playback priority.

1. Create Timelines and Timeline Groups in the Timelines pane.
2. Add media from the Media Pane to the Timeline.
3. Edit the Timeline and media's properties in the Properties pane on the right.
4. Add actions, if needed, from the Actions pane onto the Timeline.
5. Play back the Timeline using the Timeline Playback Controls.

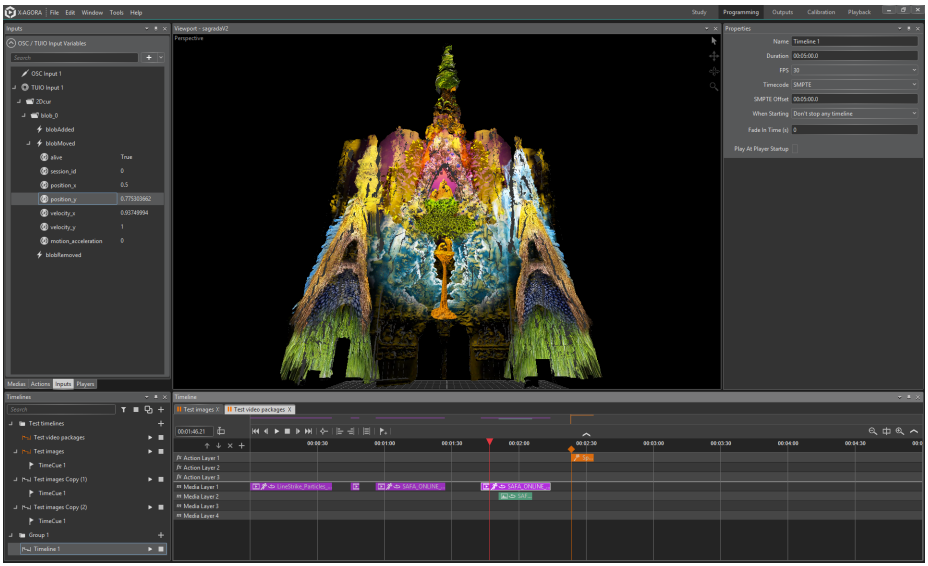


Figure I.24. Programming layout

See *Window menu panes (p.93)* for descriptions of the elements of the interface.

I.3 Calibration layout

Use the Calibration layout to calibrate individual projectors when on site. X-Agora features four projection calibration tools, most of which can be used in conjunction with each other. The documentation for each tool outlines the other calibration tool with which it should or should not be used.

Click on **Calibration**, on the right-hand side of the menu bar at the top of the screen, to enter the Calibration workflow layout.

I.3.1 Calibration workflow

1. Select a projector from the list in the Projectors pane.

   This enables the selected projector for calibration in the Calibration pane.

2. Select from five different calibration tools: Reverse Mapping, Edge Warping, Manual Blending, or Warping.

   Each of these tools can be turned on or off by using a checkbox. The calibration effect from those tools is applied in the order in which the tools are displayed.

3. Click the Start button, in the Calibration pane, corresponding to the tool.

   When using a tool, the Viewport switches to display the image that is to be projected by the selected projector.

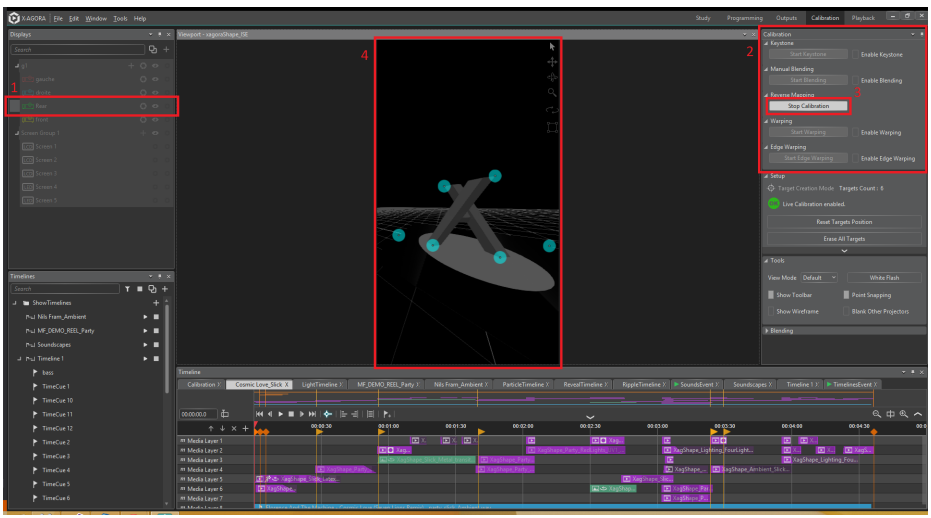


Figure I.25. Calibration workflow layout

I.3.2 Calibration interface elements

The main Panes used in this layout are the Displays pane, the Calibration pane, and the Viewport pane. Timeline related panes are also visible, so that you can test with actual content while calibrating. See *Window menu panes (p.93)* for descriptions of the elements of the interface.

Note

Unlike the other layouts, the Calibration Layout displays the Calibration pane by default, instead of the Properties pane. The purpose of this layout is only to calibrate projectors, not modify their properties. If needed however, the Properties pane can still be shown by selecting it from the Window menu.

I.3.3 3D calibration

Reverse mapping

Reverse Mapping is the preferred mapping tool when projecting onto a surface that is not flat. This mapping tool requires you to have an accurate 3D model of the projection surface onto which you are projecting.

The Reverse Mapping tool adjusts the position of projected material by moving arbitrary 3D points in the view. These 3D points should be placed correctly on the real model, which allows the Reverse Mapping tool to deduce the real position of the projector and create the proper projected image. Automatic blending is also calculated based on reverse mapping of multiple projectors.

Note

Do not use the Reverse Mapping tool when using the Warping tool to do a full-screen keystone.

Reverse mapping workflow

1. Select the projector you want to reverse map in the Displays pane.
2. Click the Reverse Mapping drop-down menu, in the Calibration pane, and click Start Calibration.
3. Click Creation Target Mode, in the Setup section of the projector's properties, and place a target on the geometry by left clicking in the Viewport.

   Targets should be strategically spread across key vertices of the geometry - usually corners and other prominent features.
4. Left-click to place the real position of the target, shown by a green cross at the correct position on the real physical model.

5. Use arrow keys to position more accurately the real position of the target.
6. Press enter to validate, once the position is properly set.
7. Repeat steps 3 through 6 until at least six targets have been positioned.
8. Check **Enable Live Calibration** to calculate the real position of the projector and to adjust its output to match the targets.
9. If needed—move the targets until the projected image of the projector matches as closely as possible the geometry upon which it is being projected.

   This may take many passes to perfect. Selecting a target on the geometry is done by clicking it. Selected targets are shown as red, unselected ones are shown as blue.
10. If needed—add more targets to fine tune the calibration.

    Click **Creation Target Mode** and place additional targets on the geometry. These targets can then be moved the same way as the initially created targets.

If you need to delete a target, select it and press the **Del** key.

Right clicking with the mouse temporarily shows an all-white image, to help with calibration.

Note

A minimum of six points must be set before Reverse Mapping can be calculated.

Tip

When choosing the calibration points, follow these simple tips to make the calibration as efficient as possible:

- Avoid choosing points lying in the same depth, the more depth amplitude you have for your points, the easier the calibration will be.
- Do not add too many points. The more points you add, the less influence each point has when being dragged. You should be able to calibrate efficiently with six or seven points.

Reverse Mapping controls

When not enabled, the following options can be set.

Show Points	Toggles between showing and not showing the target points
Reset	Removes all the target points

When enabled, the following options can additionally be set.

Rendering Mode	Identifies a specific rendering mode for calibration purposes
Targets Transform Mode	Specifies how moving a point influences the calibration (*Freeform*, *Roll*, *Zoom*, or *Pan*)
Do Not Blend With…	Specifies for which other projectors this projector should not calculate the automatic blending
Blending	Toggles the automatic blending between enabled and not enabled for this projector
Adjust Black Level	Toggles the black level adjustment between “enabled” and “not enabled” and displays the value of the black level multiplier
Dimmer	Sets the value of the dimmer of this projector
Gamma	Adjusts the gamma of this projector
Black Level Compensation	Toggles the black-level compensation between “not enabled” and “enabled” for this projector The value can also be set, which affects how the black-level compensation is spread.
Blending Optimization	Toggles the blending optimization between "not enabled" and "enabled" The KSet1 can also be set, which affects how the automatic blending is spread.

I.3.4 2D projector calibration

Edge Warping

Use the Edge Warping tool to move or distort parts of the image projected by the camera. Arbitrary triangles or quads in the image can be defined and moved. This tool can be used along with any other tool.

Although it could be used to calibrate a projector by itself, this tool is best used to apply small adjustments after the Calibration layout has been used to roughly calibrate the projectors, or to move elements in a 2D display that have been output to a matrix.

As opposed to the Warping tool, which produces a smooth image, this tool is more suited for shows that have geometric surfaces or content containing straight edges. The Warping tool would smooth the edges, which could produce undesirable results, but the Edge Warping tool allows you to exactly position a shape.

This tool is based around the concepts of points and shapes. Points are defined in the image, and shapes (triangles or quads) are defined using those points. These shapes and their points can then be moved, changing where those elements are placed in the

resulting image. Moving points that are part of multiple shapes has an effect on all of those shapes. If the user only creates a shape and moves it, the adjacent elements are not modified, resulting in discontinuity in final image. If a shape is part of a mosaic-like structure, however, where its points and edges are used in adjacent elements, moving it adjusts the adjacent elements, keeping the resulting image continuous.

Shapes defined with this tool can also be used as all-black masks in the image.

This tool can be zoomed in or out and panned with the mouse wheel.

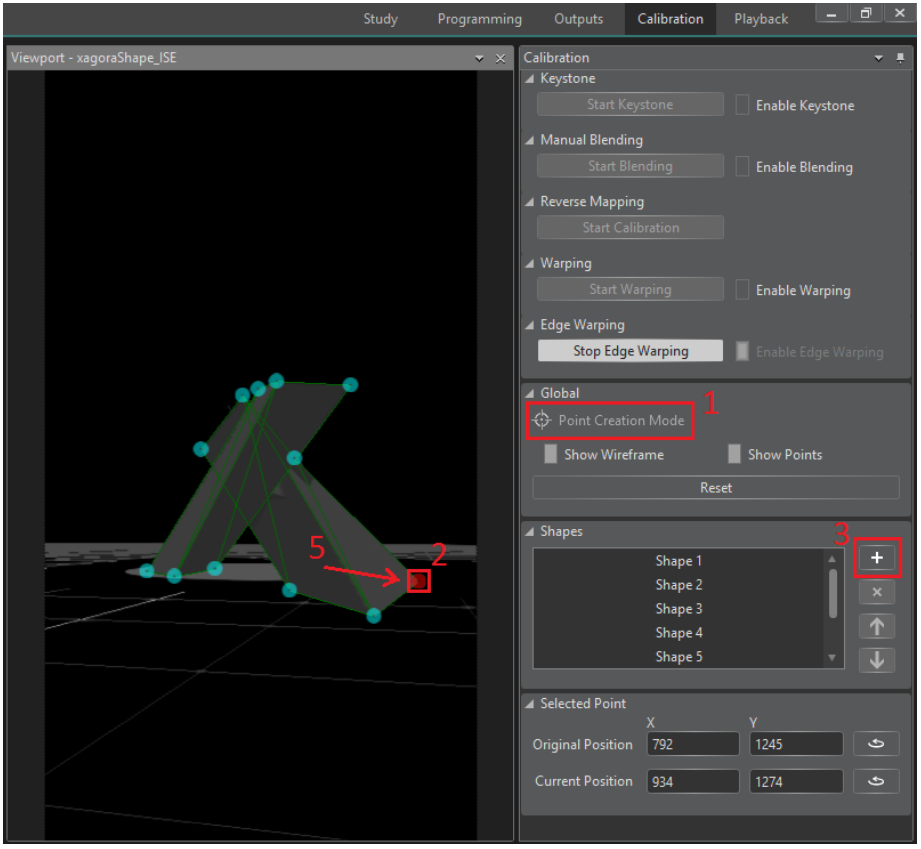


Figure I.26. Edge Warping workflow

Edge Warping workflow

1. Select **Point Creation Mode** (in the Global section or the Calibration pane) and place points on the image in the Viewport pane.

   Points should be placed at edge intersections, image corners, or at the edge of content that is to be displaced.

2. Select three or four points by clicking on them.

a. Multiple points can be selected using the **Shift** key.

b. Selected points are shown in red, unselected points are shown in blue. By default, newly created points are selected.

3. Click on **Create New Shape** (the **Plus** sign) to create a new triangle or quad from the selected points.
4. Repeat Steps 1 to 3 as needed to create the points and shapes that you need.

   To delete a point or a shape, select it and press the **Del** key.
5. Move the points and shapes until the projected image fits accurately on the surface.

Tips

- If the image contains no empty regions, define a mosaic of your whole image starting from the four corners, in order to preserve continuity.
- Keyboard shortcuts can help defining points and shapes faster.
  - **Ctrl**+click can be used to create points.
  - The **F** key and the **Del** key can be used to create and delete shapes.
  - **Shift**+click can be used for multiple selection and deselection.

Edge Warping controls

The Global section of the Calibration pane provides controls for displaying points and shapes in the Viewport pane.

Show Wireframe:	Toggles between showing or not showing the shape wireframes.
Show Points:	Toggles between showing or not showing the points.
Reset:	Removes all points and shapes.

The Shapes section of the Calibration pane provides controls to create, delete, or modify shapes.

Create New Shape (+):	Creates a new shape from selected points. You can also use the **F** key to create a new shape from the selected points.
Delete Shape (×):	Deletes the currently selected shapes.

You can also use the **Del** key to delete selected shapes.

Move Shape Up (↑) or Down (↓): Moves a shape up or down in the list.

The position of a shape in the list corresponds to its drawing order.

The Selected Point section of the Calibration pane provides controls to modify the properties of a selected point.

Original Position X/Y: Sets the position in pixels of the selected point in the source-camera image.

Reset to Current Position: Sets the current position of the selected point as the source position in the camera image.

Current Position X/Y: Sets the modified position in pixels of the selected point.

Reset to Initial Position: Reverts the current position of the selected point to the original position of the selected point.

The Selected Shape panel provides controls to modify the properties of a selected shape. The points that are part of the shape also show their Point properties.

Name: Name of the shape.

Draw Mode: Determines how the shape is drawn and transforms the source image.

- "None" does not transform anything (disables a shape).
- "Move" moves the shape and leaves black where the shape initially was.
- "Duplicate" copies the shape, leaving the original content untouched, as opposed to "Move."
- "Mask" draws the shape all black.

Manual Blending

Unlike the Reverse Mapping tool, the 2D projector calibration tools—Warping and Edge Warping—require manual blending. The Blending tool adds blending to the edges of the selected projector. Blending should be used when more than one projector is displaying content in the same region on the surface. Blending allows the seamless and smooth overlap between two projectors. Manual blending should not be used with Reverse Mapping, because the Reverse Mapping tool already calculates blending.

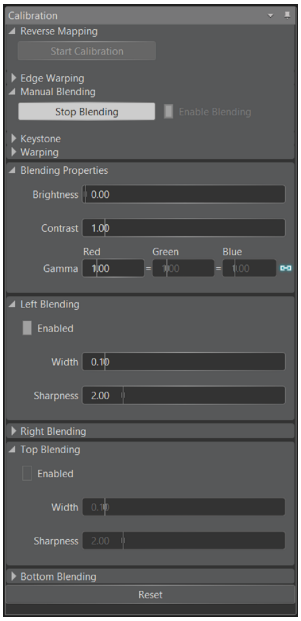


Figure I.27. Calibration layout—Manual Blending

Different blending properties can be defined for each of the projector's edges (left, right, top, and bottom).

Brightness: Adjusts the brightness of the projected image

Contrast: Adjusts the contrast of the projected image

Force color: Projects the specified color instead of the projected image, for calibration purposes

Gamma: Adjusts the gamma of the projected image

Gamma can be set individually for each color component (R, G, and B). By default, all three components keep the same value when changed. To disable this behavior, click on the link icon (similar to scaling in 3D object properties).

Reset: Resets all the blending properties to their initial values

Edge-specific properties can also be set for a specific edge.

Enabled: Enables the blending for an edge

Width: Defines the width of the blending for the edge

Sharpness: Defines the sharpness of the blending for an edge

A higher sharpness results in a well-defined border for an edge's blending, while a lower sharpness results in a smoother effect.

Warping

The Warping tool applies distortions to the image projected by the camera. It can apply small distortions, or it can warp an image to match a curved surface. With Perspective Correction enabled, the Warping tool can also create a keystone effect in your image. This tool can be used along with other calibration tools, but it should *not* be used to do a full-screen keystone if Reverse Mapping is also used.

2D points created in the image can be moved, along with their tangents, and a Bezier surface defined by the points is used to distort the image in a smooth way. Moving a point or its tangents has an effect on the immediate vicinity of the point or its tangents.

This tool can be zoomed in or out and panned with the mouse wheel.

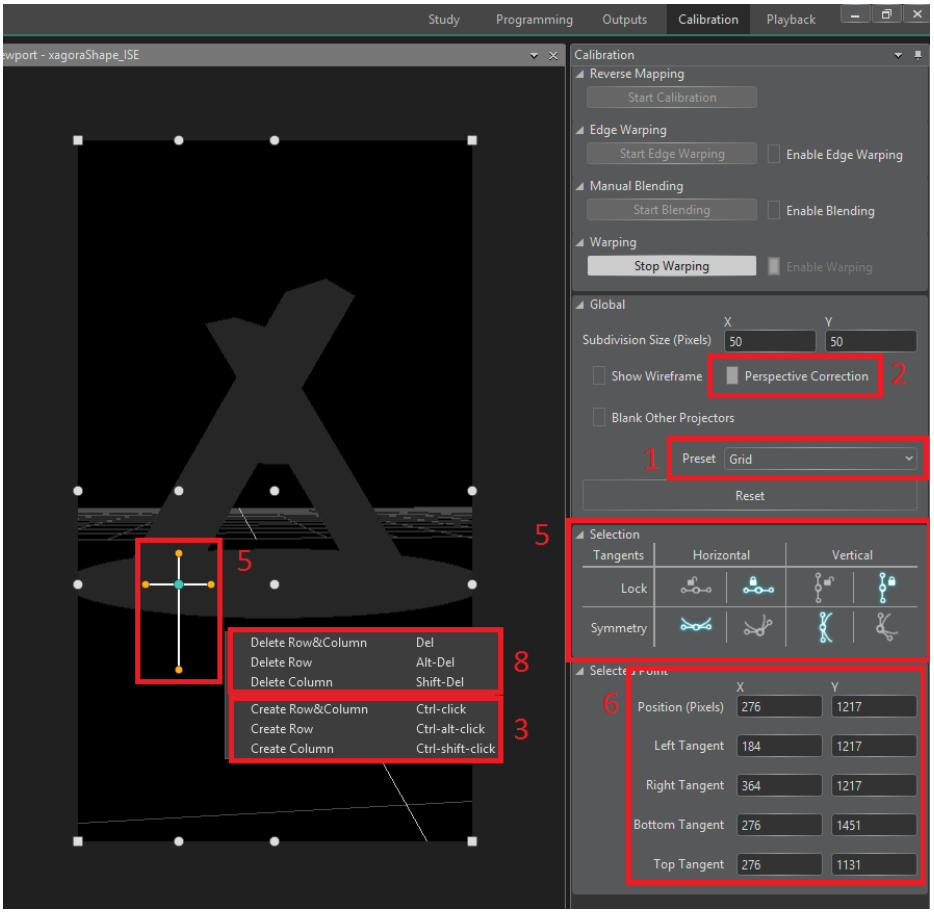


Figure I.28. Warping workflow layout

Warping workflow

1. Select a preset that fits your needs. See ***Preset:*** in *Warping controls (p.182)*.
2. Disable Perspective Correction if it is not needed, for example, if you are using warping only to correct some content inaccuracies.
3. Create new points if needed with the right click menu or by using the **Ctrl**+click shortcut.

   A point cannot be created alone; it must be part of a row, a column, or both. If a row or column already exists for a specific location, create only the missing axis to avoid duplicate points.
4. Select points by clicking on them or dragging a selection box.

   Selected points are shown in blue and display the tangent manipulators, unselected points are shown in white. In perspective mode, corners cannot be multi-selected. Points can be added to the selection using the **Shift** key.
5. Move selected points with the mouse or arrow keys.

   Selected points' manipulators can be moved to drag tangents. Lock and symmetry options for the selected points' tangents can be set with icons in the Selection section of the Calibration pane. See ***Tangent Lock:*** and ***Tangent Symmetry:*** in *Warping controls (p.182)*.
6. Set the positions manually, in pixels, for a single selected point and its tangent in the Selected Point section of the Calibration pane.
7. Move the points and tangents until the projected image fits accurately.
8. Delete a selected point by pressing the **Del** key or using the right-click menu.

   As with point creation, a point cannot be deleted alone. A point must be deleted with its row, its column, or both.

Warping controls

Subdivision Size:	Determines the size of subdivisions use for the Bézier surface. The lower the size, the smoother the image will be. Subdivision size can be set individually for X and Y axes.
Show Wireframe:	Toggles whether the wireframe is shown or not shown when editing the warping.
Perspective Correction:	Toggles whether the perspective is automatically corrected or not when moving the corners of the warping.

Preset: Creates a default configuration of control points based on a preset.

Points can be added or deleted from any preset. When changing from one preset to another, the existing warping is preserved as much as possible.

Preset	Description
Keystone	Creates four points in the corners of the image. Use this default preset to do a simple keystone.
Horizontal	Creates four points in the corners of the image *and* two points at the centers of the *horizontal* borders. Use this preset to map a horizontally curved screen or cylinder.
Vertical	Creates four points in the corners of the image *and* two points at the centers of the *vertical* borders. Use this preset to map a vertically curved screen or cylinder.
Grid	Creates nine points resulting in the intersection of the horizontal and vertical borders and centers. Use this preset for more complex mapping (for example, a dome) or image correction. More points will likely need to be added.

Table I.1. Warping control presets

Reset Recreates the original preset configuration of control points, and resets the positions of the control points to their original positions.

Tangent Lock: Locks the tangents of a control point, so that they are not adjusted when the control point or its neighbor is moved.

When locked, the tangents move if the control point is moved, but they are not kept in the same relative orientation and length from their neighbors. When unlocked, a tangent's length and direction are adjusted to preserve the same relation to its neighbor.

For example, when unlocked, a tangent that points directly toward a neighbor—thereby creating no curve between the point and the tangent—never creates a curve between a point and its neighbor, when either the point or its neighbor is moved.

Tangent Lock can be set independently for both horizontal and vertical tangents.

Tangent Symmetry: Enables Tangent Symmetry, so that moving a tangent on the axis also moves the opposite tangent symmetrically.

When enabling symmetry on non-symmetrical tangents, they are adjusted so that they are symmetrical.

Tangent Symmetry can be set independently for both horizontal and vertical tangents.

Warping shortcuts

Ctrl+Click:	Creates a row and a column of control points at the specified location.
Ctrl+Shift+Click:	Creates a column of control points at the specified location.
Ctrl+Alt+Click:	Creates a row of control points at the specified location.
Del:	Deletes the selected control point with its row and column.
Shift+Del:	Deletes the selected control point with its column.
Alt+Del:	Deletes the selected control point with its row.
Directional arrows:	Moves the selected control points by one pixel in the desired direction.
Shift+Directional arrows:	Moves the selected control points by 10 pixels in the desired direction.
Tab:	Selects the next control point to the right.
Shift+Tab:	Selects the next control point to the left.
Ctrl+Tab:	Selects the next control point to the bottom.
Ctrl+Shift+Tab:	Selects the next control point to the top.

I.4 Outputs layout

Use the Outputs layout to connect individual projectors and displays to the physical outputs of the graphic cards on your Player computers. The Outputs layout also allows you to tweak settings, such as the position of windows and the amount of anti-aliasing.

I.4.1 Outputs workflow layout

1. Click on each Display in the top part of the Outputs pane, and configure its attributes—including its resolution and orientation—in the Properties pane.

   The top part of the Outputs pane is called the Display Map. See *Display Map (p.185)*.

2. Click on Add Player and select the type of Player to add (based on the number of outputs). Do this for as many Players as you need based on the number of outputs required by your event and your Player license limit.
3. Drag-and-drop the name of a Display onto one of the physical outputs of a Player to connect a Display to the Player output.
4. Click on each Player and configure the attributes of the Player in the Properties pane.
5. Click on the gear icon in the Display Map to show and modify the global color correction settings, such as brightness and gamma.

Note

In X-Agora, a display can be connected to only one Player at a time. To connect a Display to two Players, you must first copy that Display, and then assign the copy to the second Player. You must also make sure that the media you expect to play appears on this copy.

I.4.2 Displays

Display Map

The top part of the Output layout is the Display Map. It is a visual representation of all the Displays (Projectors and Screens) in the current Projection Study of your 3D project. For 2D projects, all the Displays are available, because there is no concept of Projection Study. Displays can be moved around in this 2D map without any impact on their actual output. This can be useful to group Projectors based on arbitrary categories or physical connections.

When Players are running, their related Displays show periodically refreshed output previews, so you can see the visual output from those Displays.

When you click on a Display, the Properties pane shows you all its attributes. When this Display is assigned to a Player Output, the properties of this Player Output are also shown.

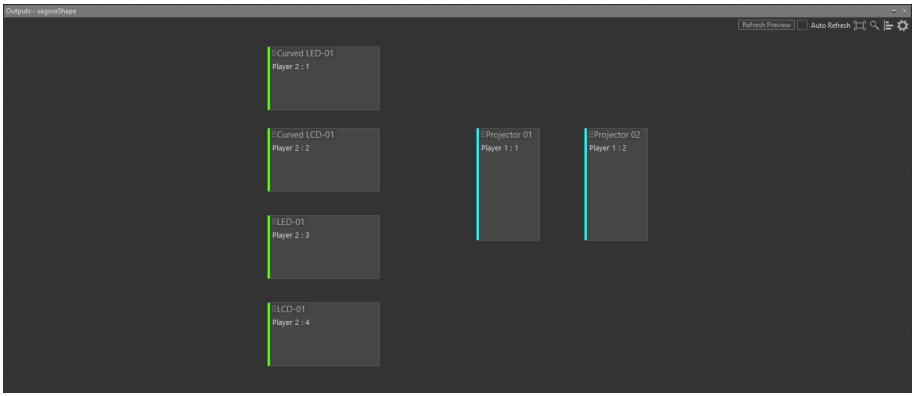


Figure I.29. Outputs Display pane

Display Map controls

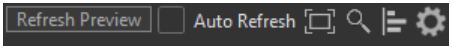


Figure I.30. Display Map controls

The controls in the top-right corner of the display map allow the following operations:

Auto refresh:	Updates automatically the low-resolution previews of active Displays. When this box is unchecked, a **Refresh Preview** button appears, so that you may manually refresh these previews.
Auto fit:	Fits all the Displays in one view.
Show thumbnail:	Displays a zoomable map of all the Displays in the Display Map.
Align to viewpoint:	Aligns the Displays in the 2D map according to the Canvas viewpoint defined in the Content Production tool. See *Content Production (p.142)*.
Show properties:	Show the global Color Correction properties. See *Color Correction (p.200)*.

I.4.3 Display properties

In addition to its name, a Display has properties related to its orientation, resolution, and model, which are shown in the Properties pane. Projectors, LED screens, and LCD screens each have their own properties on top of these, for example, for the projector lens or LED pixel pitch.

When it is attached to a Player Output, a Display also indicates the name of that Player and the index of the output to which it is connected. It is also possible to access the color correction properties of the Display.

Specifications

Technical information related to the model, resolution, orientation, attached Player, LED pixel pitch, and screen brightness is displayed in the Specifications section of the Properties pane. This information is typically entered in the Projection Study layout during the early stages of a project.

Once a display has been attached to a Player, the name of that Player and the output index of the attached display are also shown in this section.

Test Pattern

The Test Pattern section of the Properties pane has an Image property that can be used to replace the Display's output with a predefined image. This can be helpful to ensure that your physical displays' colors match or to quickly identify a physical projector on site.

Output Correction

The following properties can be modified in the Output Correction section of the Properties pane.

Object Mask (Projectors only): The Object Mask field provides a list of 3D objects that can be used as masks for this projector. This is useful if you want a projector to never project onto specific objects in your scene. The objects are always displayed in black.

PNG Mask: The PNG Mask field shows the file name of an image that can be displayed as an overlay over the displayed content. This image must contain an alpha channel, and therefore be in an image format that allows it, in this case PNG. A PNG mask is useful for masking specific regions of content that are not 3D objects, or applying final on-site feathering of overshooting regions. This image must be drag-and-dropped from the Medias pane (as opposed to from Windows explorer), which can be shown (or hidden) by using a button next to this control.

Remap Image (Projectors only): A Remap Image allows per-Projector pixel remapping. This texture contains information for where each pixel is supposed to be in the final image. (Red and green stand for X and Y positions in the destination image.) This feature allows you to perform advanced projector-specific adjustments that are impossible with a PNG mask or regular Projector calibration. This image must be drag and dropped from the Medias pane (as opposed to from Windows explorer), which can be shown (or hidden) by using a button next to this control.

Dimmer: Dimmer allows you to adjust the value of the dimmer, between 0.0 (all black) and 1.0 (no dimmer), for the Display.

Min Input: This is a minimum value to clamp the displayed color channels.

Max Input: This is a maximum value to clamp the displayed color channels.

Hue Offset: Self-explanatory

Saturation: Self-explanatory

Brightness: Self-explanatory

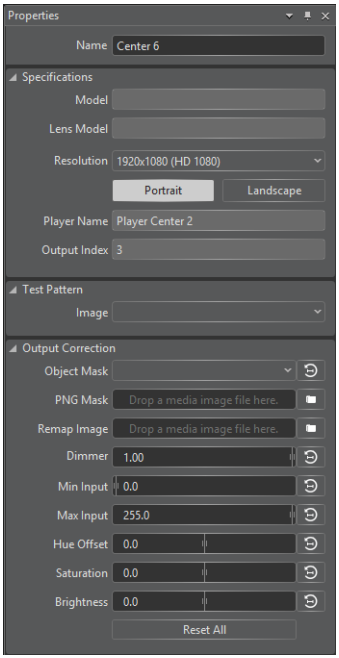


Figure I.31. Outputs Properties pane for a projector

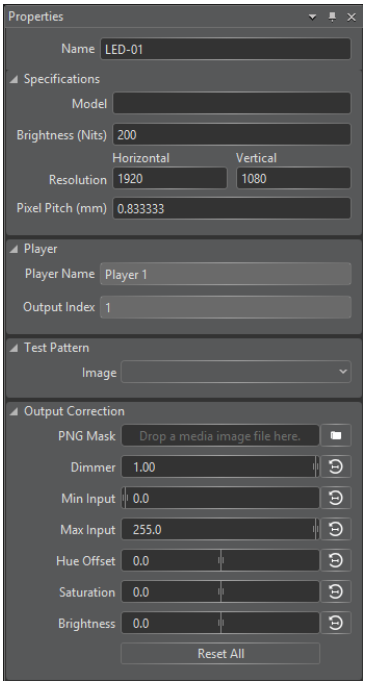


Figure I.32. Outputs Properties pane for an LED display

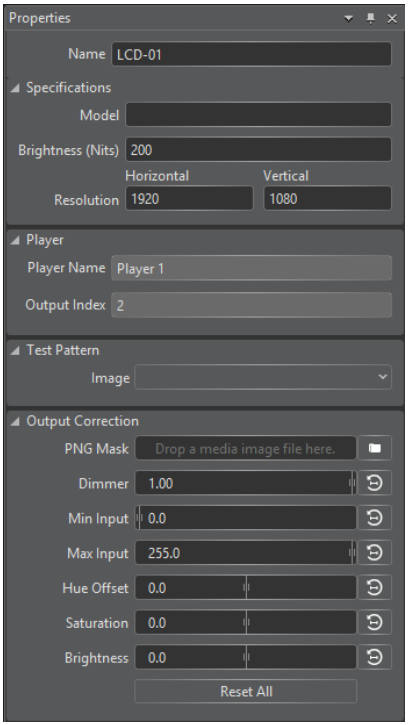


Figure I.33. Outputs Properties pane for an LCD display

I.4.4 Players

Players Map

The bottom part of the Output Control layout is the Players Map. It is a visual representation of all the Players in the current projection study. Players can be moved around in this 2D map without any impact on their actual output. It can be useful to group Players based on arbitrary categories or physical proximity. Figure X shows an example of a Players Map.

Note

The Master Player, Player Center 1 in the figure, is shown differently than are other Players. The Master Player has a tab labeled "Master."

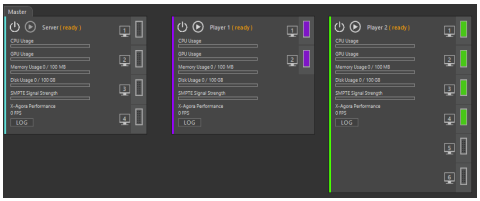


Figure I.34. Outputs Players Map

Player Types and Licenses: X-Agora Players with different numbers of outputs are available. In order to launch X-Agora Player on a Player machine, its host needs to have the right local license, either as an embedded software license or a physical USB dongle. These licenses also restrict the number of physical live inputs that should be on a computer. Runtime protection enforces these restrictions; if you try running a Player that has more physical live inputs or more connected Player outputs than are allowed, the Player closes and you are notified of the issue in X-Agora. See *Licensing (p.30)* for more information on Licensing.

Player Status: A Player's status can be either “offline,” “ready,” or “playing.” A Player is “offline” when the Player machine is turned off, X-Agora Agent is not running, or the Player is not connected to the same X-Agora Server. When the X-Agora Agent connection is established, the Player is “ready,” meaning that the Player can be launched. Once a Player is launched, its status is “playing,” and its performance information and preview are updated.

Player Performance: When a Player is running, it periodically sends performance information to X-Agora. You can access this detailed performance information by hovering your cursor above each property and its related gauge.

The information available includes:

CPU usage	average processor usage and processor usage per core
GPU usage	graphics card name, load, and temperature
Memory usage	combined random-access memory usage
Disk usage	combined and partition-specific disk usage
SMPTE signal strength	the real-time audio level of the SMPTE signal, if it is used
X-Agora performance	software version, frame rate, application uptime, CPU usage by X-Agora Player, and computer uptime

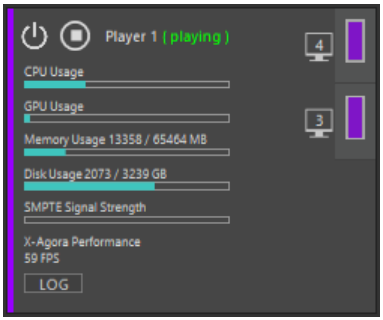


Figure I.35. Player performance

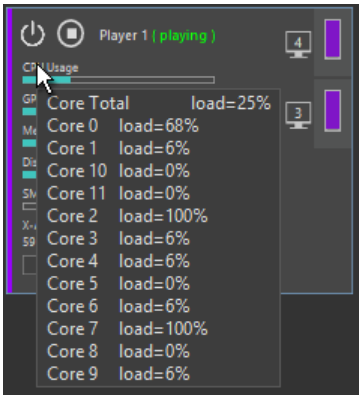


Figure I.36. Player performance—

Individual Player controls

Shutdown

Restart

Wake-on-LAN (available only when the Player is offline)

Play/Stop (available only when the Player is ready and has outputs connected to it)

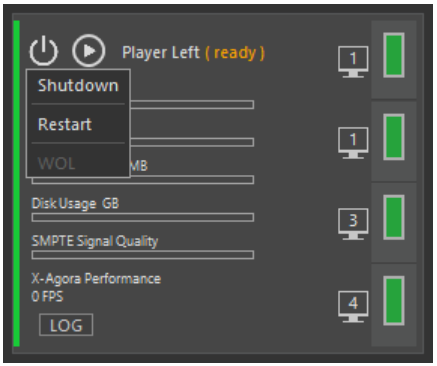


Figure I.37. Player controls

Player Map controls

Figure I.38. Player Map controls

The controls in the top-right corner of the Player Map allow the following operations:

All Logs:	Displays all the information logged by X-Agora, including useful debugging information for your project, the software, or your licenses.
Sync All Players:	Synchronizes the required logic and media files across all Players, so that all of them have the resources to launch your project.
Connect All Agents:	Requests that the Agent for every “offline” Player in the map connect to the Master Player. This makes the Players “ready” if they are powered on. Machines that are powered off can be powered on by using the WOL feature.
Start All Players:	Launches all the Players of the project that are ready.
Stop All Players:	Stops all the Players of the project.
Auto fit:	Fits all the Players in one view.
Show thumbnail:	Displays a zoomable map of all the Displays in the map.
Add:	Adds Players with the specified number of outputs to the map, or automatically adds all detected Players on the network.

I.4.5 Player properties

A Player has properties related to its physical host and connected projectors. These properties are grouped into different expandable menus. *Figure I.39, "Expandable menus of the Player Properties pane"* shows the expandable menus in the Properties pane.

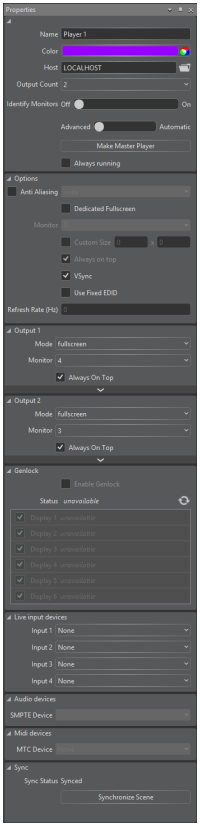


Figure I.39. Expandable menus of the Player Properties pane

Master Player

One player must be the Master Player. This is the computer on which the X-Agora Server application runs. The Master Player also receives the SMPTE signal, if needed. To quickly identify the Master Player in your map, look for the player with a tab labeled "Master," as shown in *Figure I.40, "Master Player"*.

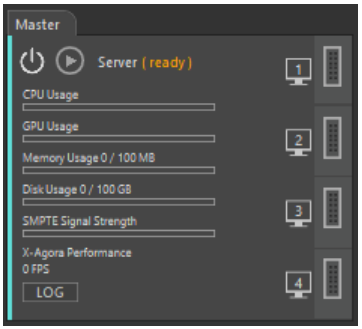


Figure I.40. Master Player

Main properties

Name: A Player can be assigned a name, for mnemonic purposes.

Color: A Player can be assigned a color, which is assigned to all its connected Displays.

Host: A Player runs on a physical machine, which must be referenced here by using its host name or IP address.

Output Count: Select the number of physical outputs that are to be connected to this Player.

Licensing restricts the number of physical live inputs that should be on a computer. See *Player Types and Licenses* in *Players Map (p.190)*, and see *Licensing (p.30)* for more information on licensing.

Identify Monitors: Display an overlay on each monitor of this computer, showing the X-Agora output index of that monitor.

Note

Monitors that are not connected to the optimal GPU are not identified and cannot be used to display Player windows.

Advanced vs Automatic: Choose between automatic and advanced modes.

Make Master Player: Make this machine the Master Player, to which all other Players will connect. The media, logic, and 3D objects of the project will be synced to this Player.

Always running: Check this box to ensure that the Player is launched immediately upon connecting to the Master Player, and also any time it is closed. Use this feature in production so that your show is launched automatically when you turn on the computers on site.

Options menu

Advanced Player options for rendering are available in the Options menu of the Properties pane.

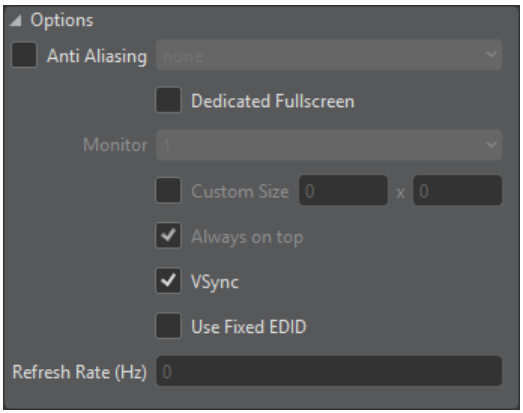


Figure I.41. Advanced Player Option menu

Anti Aliasing: Set the size of the anti-aliasing window ("none," "low," "medium," and "high").

More anti-aliasing means more smoothing of sharp lines.

Dedicated Fullscreen: Run all X-Agora Displays in a single X-Agora Player window.

This evenly splits the X-Agora window into as many outputs as are connected to the Player. This feature is used to obtain the maximum performance results of X-Agora Player. When the dedicated fullscreen mode is enabled, only one Player window is launched, but this window can span multiple screens if you are using a manually configured AMD EyeFinity Display Group.

Monitor (in Dedicated Fullscreen mode): The field shows the index of the monitor that displays the X-Agora Player window. See *Main properties (p.195)*.

Custom Size (in Dedicated Fullscreen mode): Force a custom resolution in Single Window Mode.

Always on top (in Dedicated Fullscreen mode): Determine whether or not the Player window appears on top of all other windows.

VSync: Check this box to enable vertical synchronization in order to remove video tearing due to mismatches

	between the screen refresh rate and the video feed rate.
Use Fixed EDID:	Use Extended Display Identification Data to force the machine to use and remember the specified monitor dimensions, even if no monitor is connected to the graphic card's physical output.
Refresh Rate (Hz) (when VSync is disabled):	Specify a target frame rate for X-Agora Player. Use value 0 for the maximum frame rate possible.

Outputs

The Output menu—one for each Player—shows the Player Outputs that are assigned a Display.

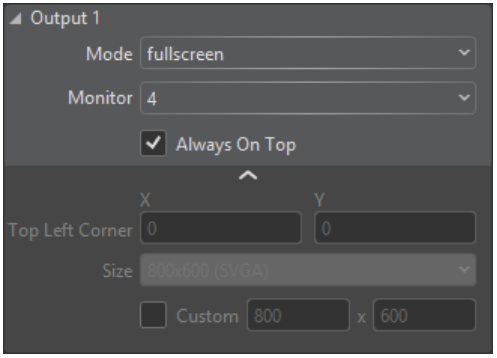


Figure I.42. Player Outputs

The following properties can be configured:

Mode:	"Windowed" means that the Player appears in a regular window with a frame, while "borderless" is the same without a frame. "Fullscreen" means that the Player takes up all of the monitor space.
Monitor:	The field shows the X-Agora monitor index, which can be identified with the toggle Identify Monitors. (See *Main properties (p.195)*.)
Always On Top:	Check this box to force the X-Agora Player to appear on top of all other windows.
Top Left Corner ("borderless" and "windowed" modes):	Specify the X and Y coordinates of the top left corner of the Player on the monitor specified in the same section.
Size ("borderless" and "windowed" modes):	Choose from a list of common monitor resolutions for the dimensions of the Player.

Custom size (“borderless” and “windowed” modes): Specify a non-standard Player resolution.

Genlock

This section of the Properties pane displays the support for generator locking a Player.

Live Input devices

X-Agora supports as many as four sources of live input on your Players. This section presents a mapping from virtual devices (e.g., “Input 1”) to physical devices (shown in the drop-down lists).

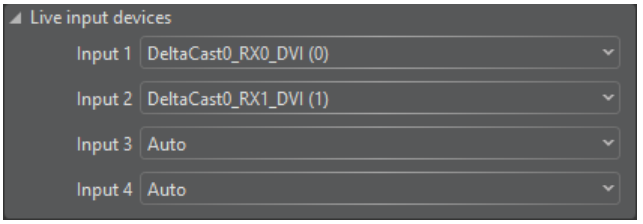


Figure I.43. Live inputs

You must define the mappings on all Players that will use live inputs.

When adding a live-input element to a timeline, you must choose which virtual device to use for that element. The example shown in *Figure I.44, “Sample Live-Input Timeline”* uses Input 1. Based on the list of live inputs in *Figure I.43, “Live inputs”*, this corresponds to physical input 0 of the DeltaCast card on this machine. If the live-input element is run on several Players, Input 1 could point to different physical cards and physical inputs. This feature gives you the flexibility to use different inputs but address them with one Timeline element.

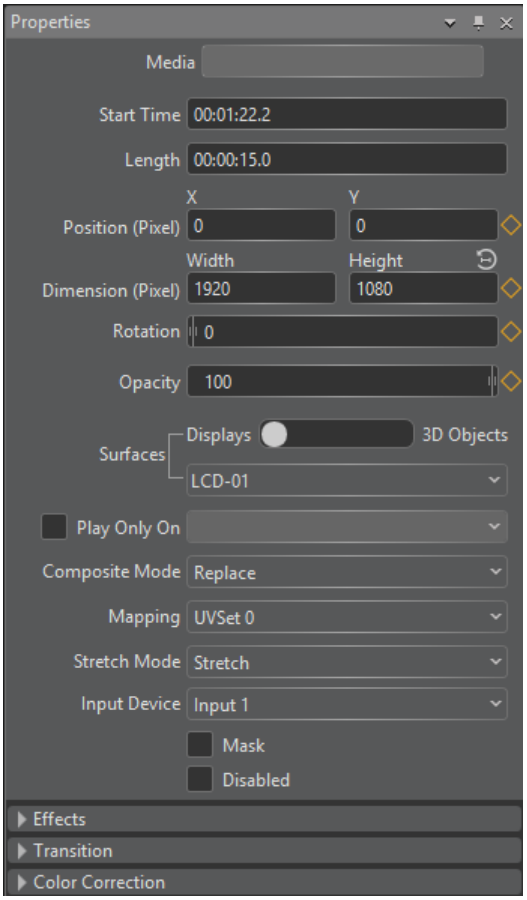


Figure I.44. Sample Live-Input Timeline

Audio devices

The Audio devices section of the Properties pane lists all the sound inputs on the Player machine, and allows you to pick the input that is used for SMPTE, on the Master Player. This list is refreshed upon booting the machine or reconnecting X-Agora Agent.

The SMPTE device can be picked only on the Master Player. The Master Player listens to this SMPTE signal and attaches the playhead of the matching timeline to the audio clock, sharing it through the X-Agora network to other Players.

If Auto is selected, the Master Player picks the first active sound input.

Sync

This section indicates whether or not the Player has been sent all the files (most crucially, the media files) that are required to run the project. A button labeled Synchronize Scene

provides the option to perform that operation again. Refer to *Player Map controls (p.193)* for information about synchronizing all the Players together.

I.4.6 Global color correction settings

Click the gear icon in the Display Map (the top part of the Output layout) to show the Global Output Control properties in the Properties pane. These properties allow global modification of all of a player's outputs.

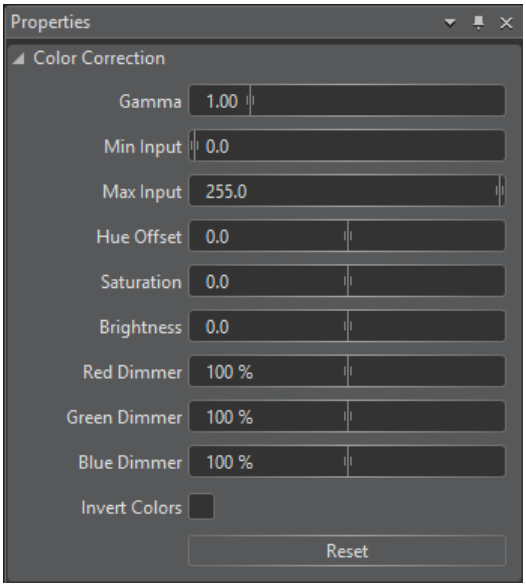


Figure I.45. Global Color control

Color Correction

Note that if a Color Correction Action is used on a Timeline, the parameters of the action override the values set here in Output Control. Color Correction adjustments for video or image Timeline elements, however, are combined with these settings.

Gamma: the gamma correction factor

Min Input: the minimum input value (black)

Max Input: the maximum input value (white)

Hue Offset: the hue offset represented, as an angle between –180 and 180 on a hue wheel

Saturation: the saturation boost factor, between –100% and +100%

Brightness: the brightness boost factor, between –100% and +100%

Red Dimmer: a control to attenuate or boost the red component

Green Dimmer: a control to attenuate or boost the green component

Blue Dimmer: a control to attenuate or boost the blue component

Reset resets the color correction properties to their default values.

I.5 Playback workflow layout

Use the Playback layout to play your show. It features a simplified interface for streamlined playback, where Timelines are not editable to avoid accidental changes. It also features the control room view of Player outputs, allowing you to monitor the output and performance of your Player machines during operation.

I.5.1 Playback workflow

1. Start Players in the Players pane, if they are not already running.
2. Play Timelines.
3. Monitor the visual outputs and performance of your Players.

I.5.2 Starting Players

The Players pane lists all of the Players of the current Projection Study, with controls to individually start or stop each Player.

Above the list of Players, the Players pane offers global start and stop buttons to launch or kill all Players.

Note

If a Player is marked as always running, it is launched as soon as its Agent connects to the Master Player, or any time it is stopped.

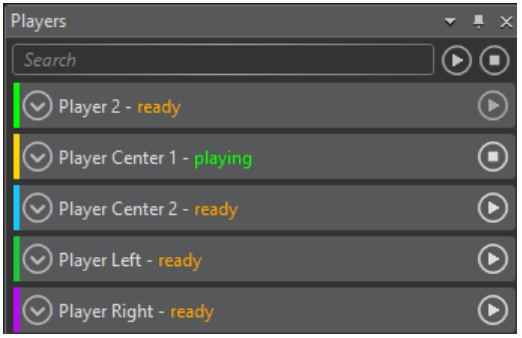


Figure I.46. Playback layout—Players pane

I.5.3 Timeline control

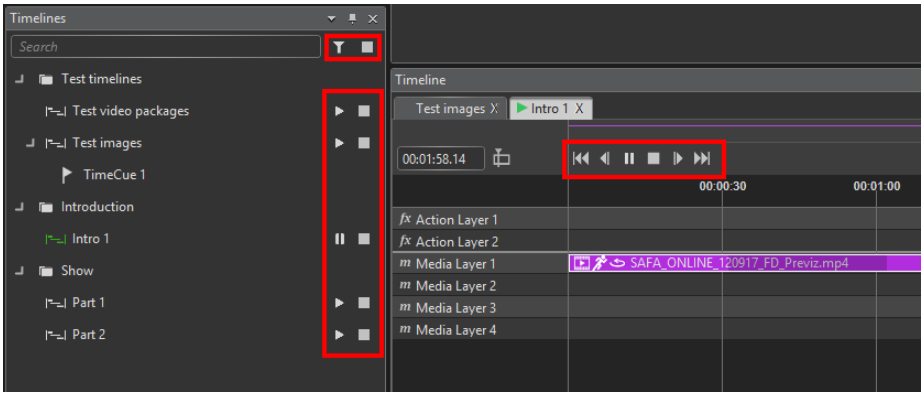


Figure I.47. Timeline controls

Timelines pane

The Timelines pane provides a list of all Timelines in your project. Each one can be played, paused, or stopped with individual buttons. All Timelines can also be stopped simultaneously by pressing the stop button at the top of the Timelines Pane. A second global button allows filtering to show only Timelines that are playing or paused.

Timeline pane

When a Timeline is double-clicked in the Timelines pane, it is opened in the Timeline pane. The following individual controls are displayed:

- Seek to the start of the timeline
- Move back one frame
- Start or pause the Timeline
- Move forward one frame
- Seek to the end of the timeline

Note

The length of a frame is determined by the frame rate of the Timeline. It is also possible to move the playhead within individual Timelines with your mouse cursor.

I.5.4 Monitoring outputs

The Outputs pane provides a preview of each output of each Player in the X-Agora network. This allows you to validate that your Players are outputting visual content,

and it is particularly useful in a large show for which you can't physically see all the outputs.

See *Display Map (p.185)* for an explanation of the Display Map and its controls.

I.5.5 Monitoring performance

You can monitor the performance of individual Players in the Playback layout as you would monitor the performance of individual Players in the Outputs layout.

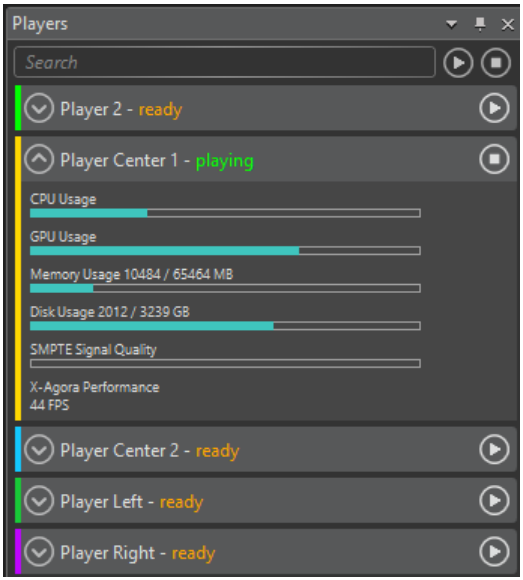


Figure I.48. Playback performance

Appendix J: More information

This section contains more information concerning keyboard shortcuts, audio and video formats, and 3D-modelling formats.

J.1 Keyboard shortcuts

J.1.1 Viewport keyboard and mouse shortcuts

Manipulation of 3D objects

Rotate:	**r**
Scale::	**e**
Translate:	**w**
View:	**q**

Viewport camera

Orbit:	RMB
Pan:	MMB
Reset View	**Home**
Zoom:	Scroll wheel

J.1.2 Timeline keyboard and mouse shortcuts

Keep the offset of dragged elements while changing layers:	**Shift** and drag the Timeline element
Panning in a Timeline	MMB and drag
	LMB+**Space**
Play/Pause	**Space**
Select/deselect multiple Timeline elements	**Ctrl**+LMB
Zoom in/Zoom out	Mouse wheel
	Ctrl+MMB provides more precision
	Shift+MMB keeps left position of the Timeline while zooming in or out
Zoom a specific part of the Timeline	**Alt** and drag

J.1.3 Global keyboard shortcuts

Redo **Ctrl+y**

Undo **Ctrl+z**

J.2 Supported 3D, audio, image, and video formats

J.2.1 Supported 3D formats

X-Agora supports .fbx, .obj, .dwg, .dxf, and .svg. Those file types can be separated in two categories: modeling software formats (.fbx, .obj) and CAD drawing formats (.dwg, .dxf and .svg). The most complete file format for X-Agora is .fbx, however you may not have control over which of those formats can be used, because the models are usually provided by an external source.

CAD drawing formats

CAD drawing formats (.dwg, .dxf and .svg) are usually made for architecture and technical plans and are created by application like AutoCAD and Sketchup. These file formats can contain either lines or faces. X-Agora can import both lines and faces, but lines cannot be projected on. If you want to use such a file and project on it, have someone with 3D-modeling software skills re-create the model with faces. Creating faces out of lines in not a trivial task. If the projection surfaces are simple, or only screens are used for projection, the lines can still be used as a reference, and simple 3D shapes or screens can be created in X-Agora.

X-Agora stores no UV information for any CAD file format, therefore UV Sets in the media elements properties will not work. To use the imported model as a projection surface, the content must use projective texturing, or a Viewpoint must be created by using the Content Production tool.

Modelling software formats

Modeling software formats (.fbx, .obj) are created by applications such as 3DS Max and Cinema4D. These files almost always contain triangular faces. If they do not, most 3D-modeling software allow you to easily export a file so that all faces are triangles. Models made from these kinds of files can be projected in the same way as CAD drawing files containing faces.

Modeling software format files can also contain UV information about how to apply content to the object. The .obj format contains only a single UV set (UV Set 0). The .fbx format can contain up to four different UV sets. These UV sets are usually created in the modeling software by people who know how to create the UV sets, while also creating a template from the UVs in which the artists can work. To use a specific UV set for a media element, it simply has to be selected in the media element properties.

J.2.2 Supported audio formats

- WAV (Waveform Audio File Format) 16-bit 44.1 KHz

  WAV files can be mono or stereo.

Note

X-Agora ignores the audio channels of video files. If you have audio that accompanies video files, you must extract it and add the audio layer to your X-Agora Timeline. This task can be accomplished with tools such as FFMpeg.

J.2.3 Supported image formats

X-Agora supports several image file formats, including...

- DPX
- JPG
- OpenEXR
- PNG
- TIFF

Image *sequences* can be converted to video files using *X-Agora Media Encoder (p.139)*.

Note

The media encoder assumes media is gamma corrected (as opposed to linear or log).

J.2.4 Supported live inputs

X-Agora supports Datapath and DeltaCast live input devices.

J.2.5 Supported video formats

X-Agora supports most common video formats and codecs, including...

- MPEG-2 and MPEG-4 (both the container and codec)
- Quicktime Animation
- Quicktime H.264

X-Agora uses FFMpeg to decode videos, and supports all its LPGL-compatible formats. See *2.3, Video Codecs* under *General Documentation* on the *FFMpeg* website (at *https://www.ffmpeg.org/*).

Use X-Agora Media Encoder to convert image sequences to video files.

Note

Media Encoder assumes media is gamma-corrected (as opposed to linear or log).

Tip

To obtain optimal performance and quality from X-Agora, it is recommended that you use X-Agora Media Encoder to encode your video content, preferably from image sequences (although entire videos can also be converted).